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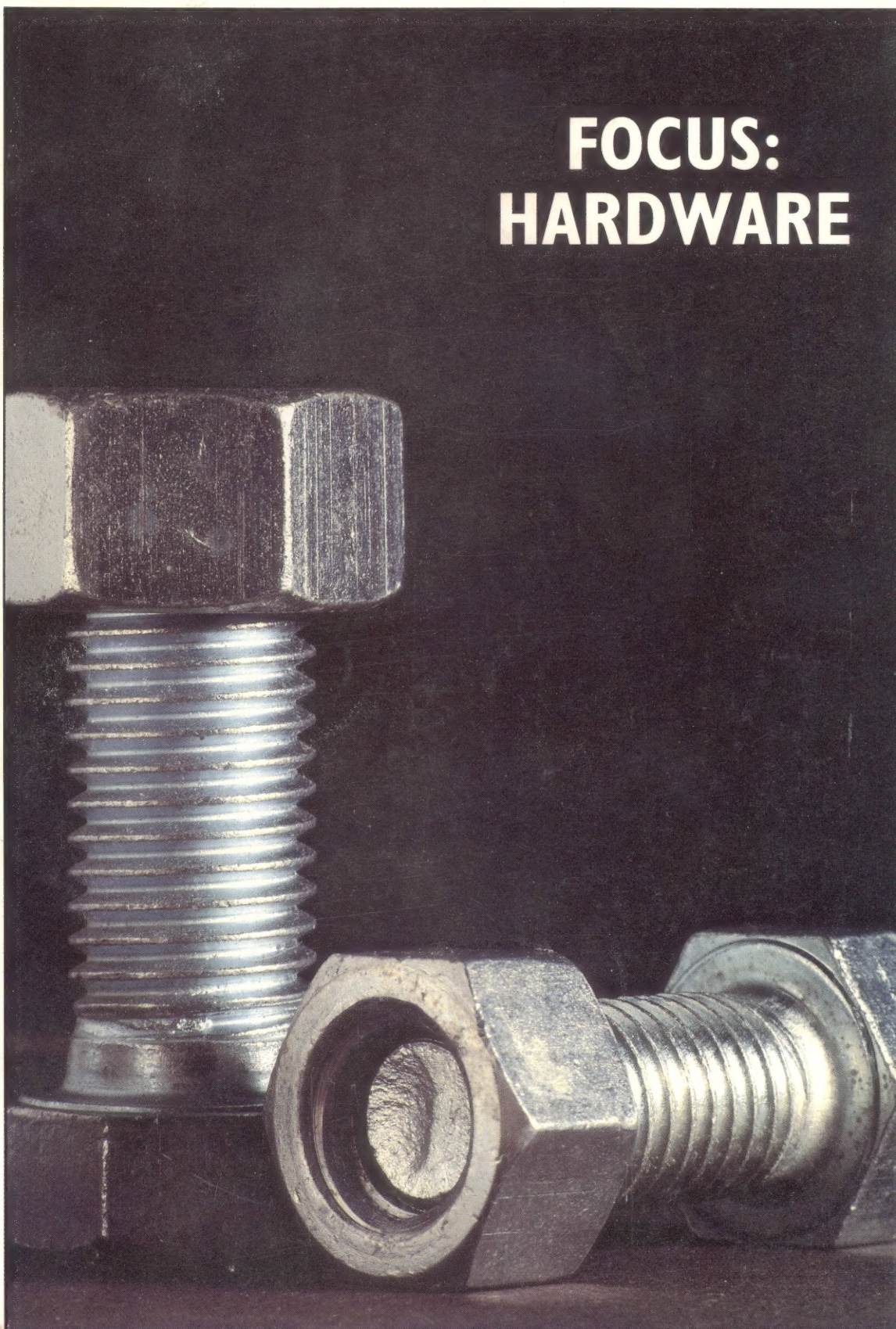
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- HP Targets PC Graphics Market
- Building A Better Mousetrap



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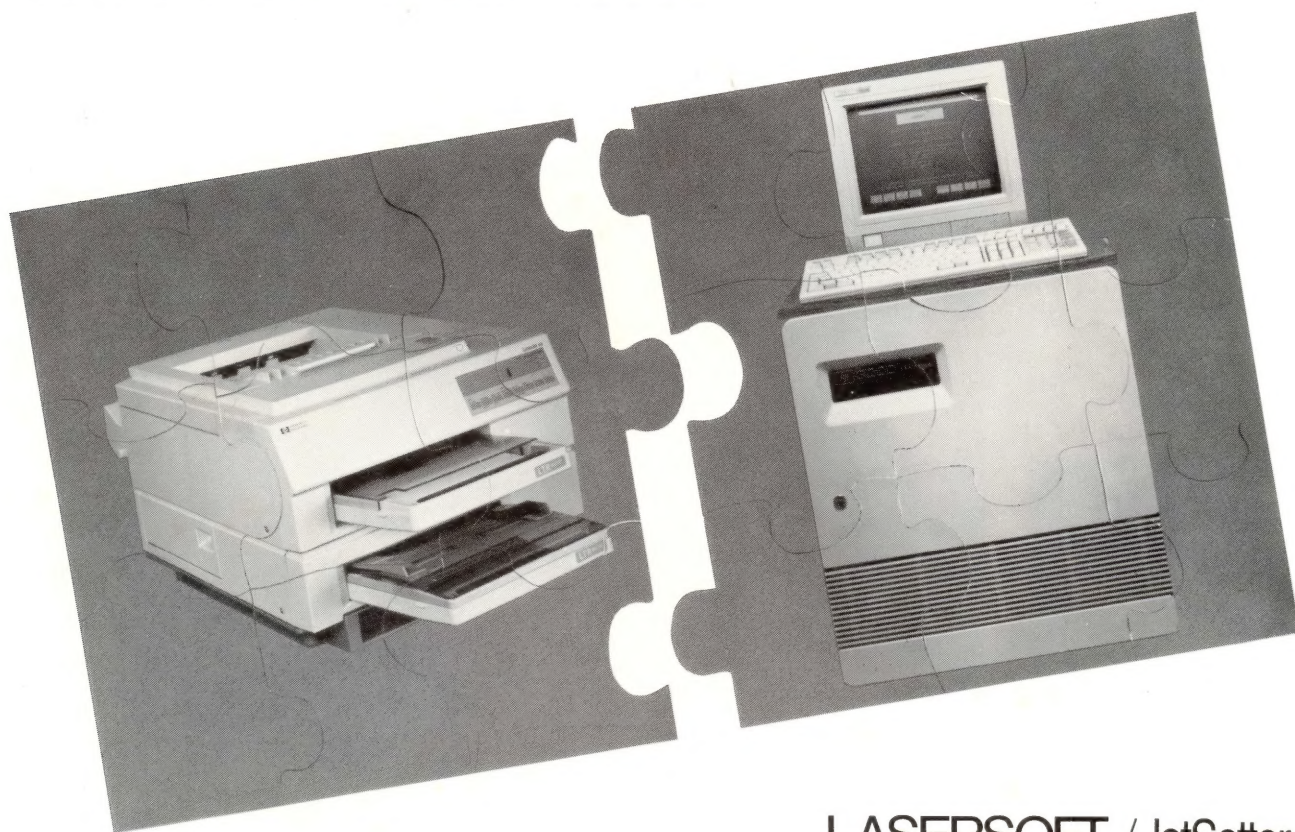
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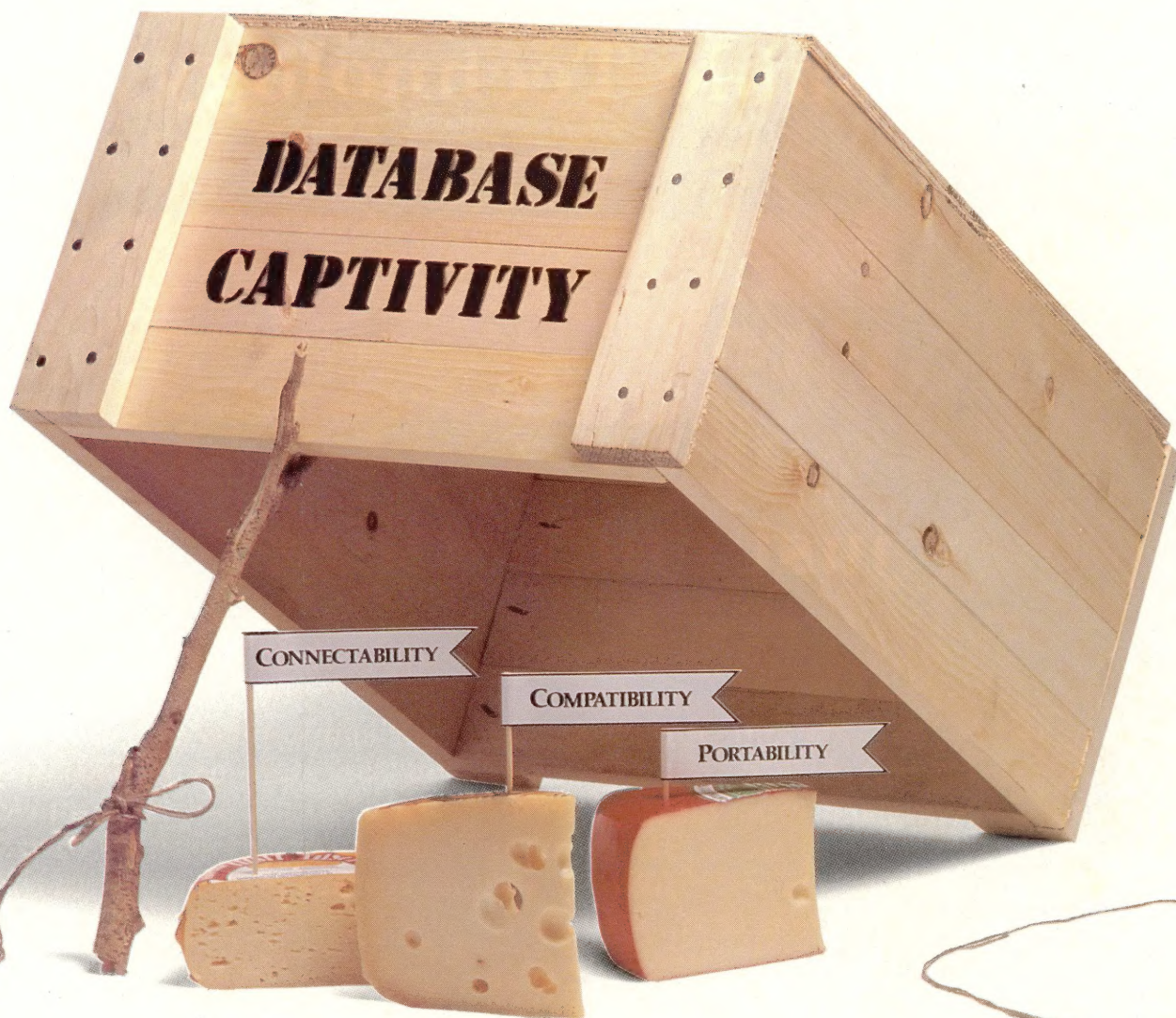
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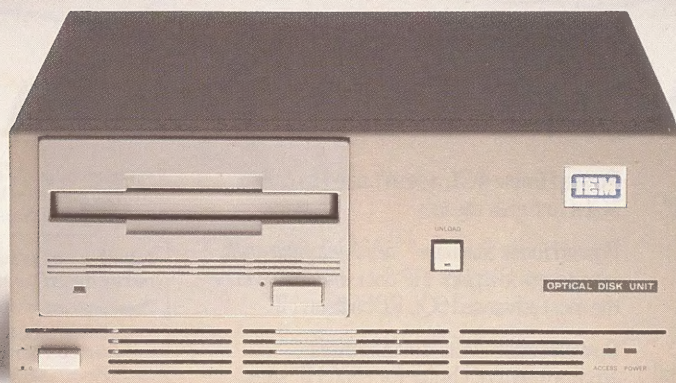
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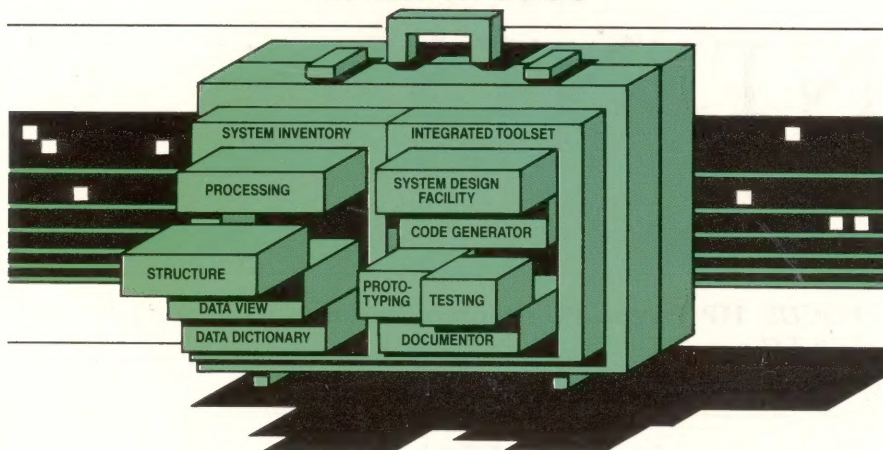
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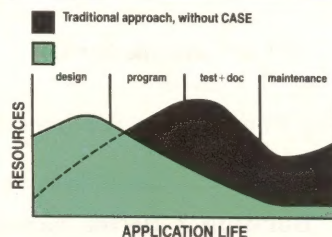
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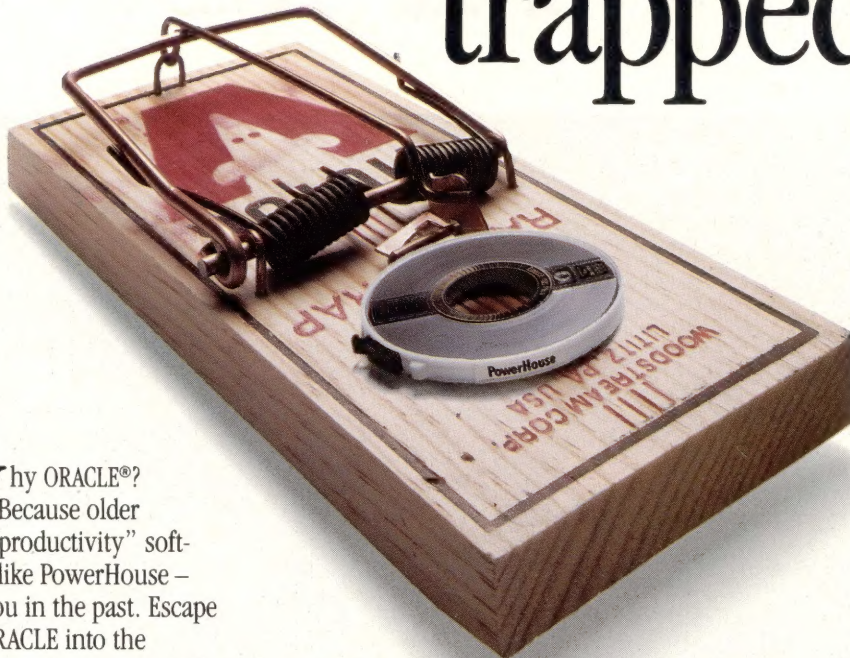
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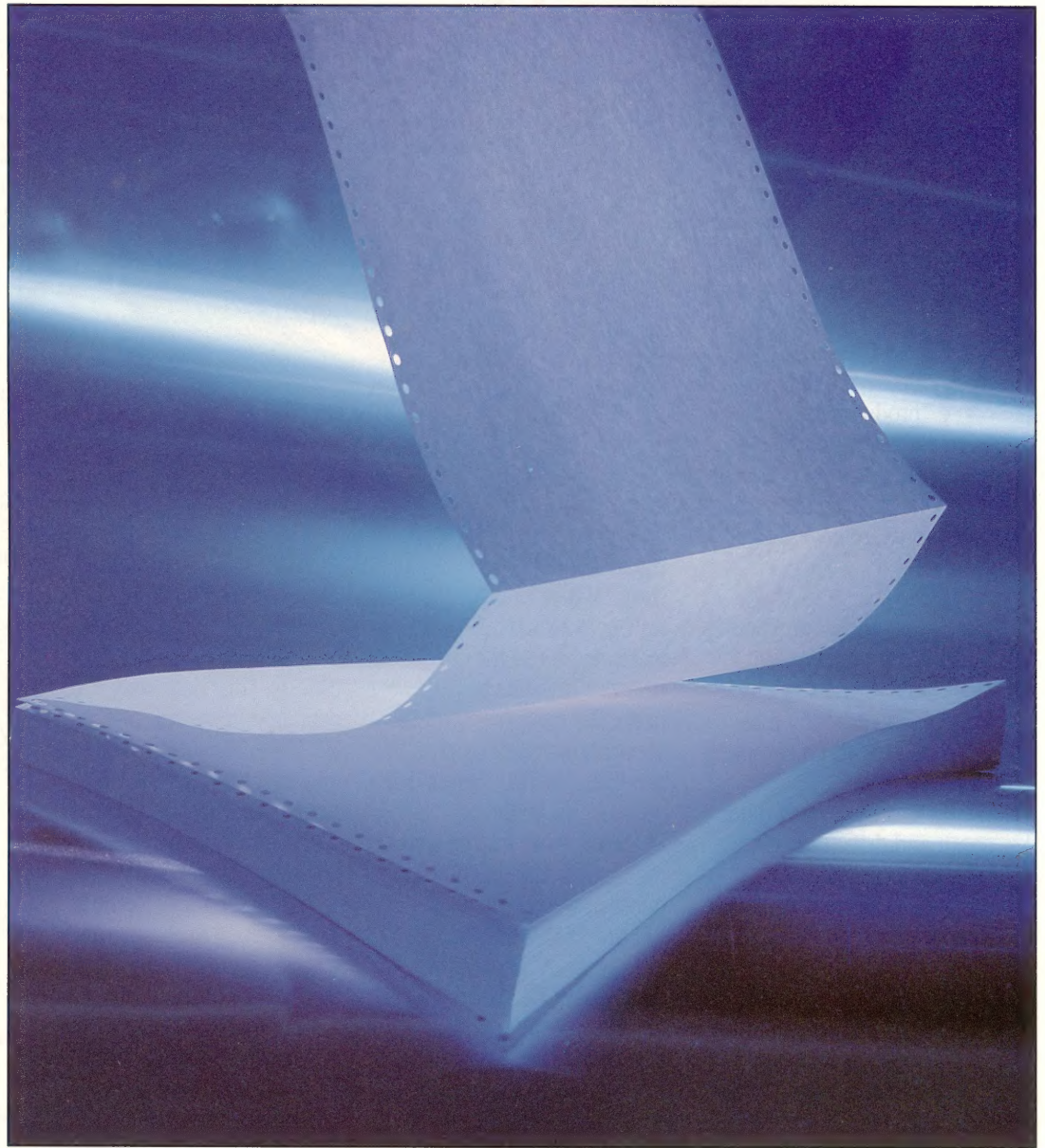
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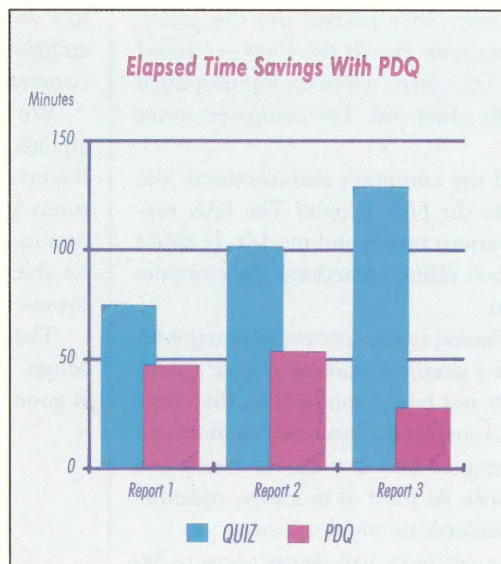
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Missing The Boat

I recently worked on a year-end accounting and legal problem that required participants from various cities. The attorneys were in Detroit, Philadelphia and Palm Beach. The accountants were in Philadelphia, and the principals were in Palm Beach, Virginia Beach and Philadelphia. In short, we were working in no less than seven different offices. The whole scenario was possible because of only one thing: FAX machines.

It used to be that everyone wondered over word processors and their ability to edit this out, change these words, or add this paragraph here. But the thing that made *document exchange* possible was the FAX, not the computers. What happened is that the word processor in one office printed out the papers and they were FAXed to everyone else in the loop — digital data to paper, paper scanned and converted to analog telephone signals and back to paper at the other end. The computers never talked to each other!

Isn't this a loss? Why did the computer manufacturers lose the communications battle to the FAX people? The FAX machines we used were all of various makes and models. It didn't matter. They all talked to each other, something the computers in each office couldn't do.

Instead of each word processing system communicating with each other, we had to insert a scanner/modem/printer system called a FAX in between. By not being compatible, the computer companies have lost an important business function and given it away to the FAX people. This is what we lose when there are no coherent standards. As most of us know, communications is an area where standards simply don't exist.

The Tower of Babel that we have had thrust upon us by the lack of communication standards is seriously impeding our ability to move forward and make our computer systems more useful. In the end, that will mean that we will buy less computer hardware, but more FAX machines and other "work arounds."

Standards

There is room for standards, without making everything the same. Automobile engines all run on gasoline, televisions all use the same antenna connections and telephones use the same modular connectors. Yet, all of these products come in different shapes and sizes. Each model seems to have some features that others don't have, and each company finds a position to sell its models.

In essence, each product line has some features and some compromises, but they have some standards that they adhere to so that their utility is increased. Ford products don't require

a special gas station, Zenith TVs will work with all cable companies and Radio Shack phones work well with the Bell network.

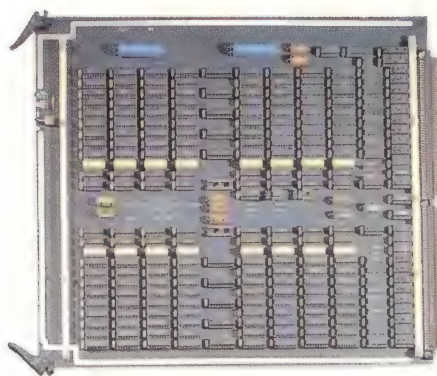
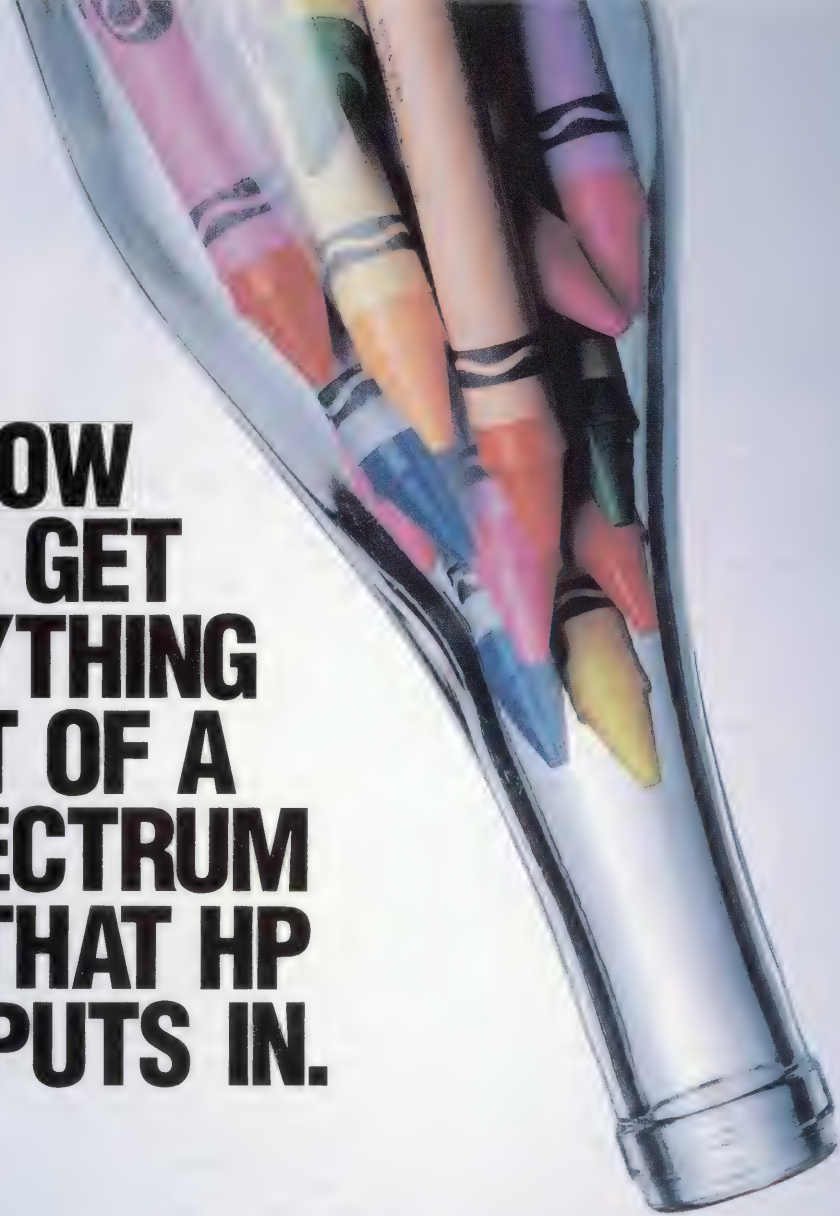
While the computer manufacturers have been covering their well-known behinds, other companies have been sneaking up. FAX machines now have invaded most offices. PCs have proliferated, and the UNIX folks have the OSF.

The time to get our computer act together is now, and while OSF is a start, it's also a potential disaster. Committees, it is said, designed the camel. I would rather see independent ideas and computer systems, including the proprietary operating systems like VMS, MVS, OS/400, MPE exist, but with a sufficiently open architecture with connections between and data exchange with computers that would be simple and easy.

We have a tough task: We must think of a way to have open architectures and ease of connectivity and yet preserve the differentness that gives us all a choice. We must protect manufacturers intellectual property and inventions and yet give the community the ability to invent add-ons and add-ins. And, we must be able to operate together but not fall into the "clone" syndrome that has given the PC market to offshore manufacturers.

These are tough questions and the answers may be just as tough. Everyone must realize that what's good for the market is good for us, and in the right spirit work towards a solution.

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HP 9000 TO VAX

QUERY:

Alan M. Collins (SIG 26/MESS 11): We have an HP 9000 Series 310 computer being used for high-speed data acquisition (500 kHz). It uses HP BASIC Version 5. We use HP's Computer Aided Test software and some of our own software to acquire high-speed data. We'd like to transfer data to our VAX so we can do data analysis using software like RS/1. The simplest method would be RS-232 through a terminal server, although Ethernet may be an option.

Is there a version of Kermit written in HP BASIC? Does anyone know of any other data transfer software? We've written our own BASIC routine to accomplish this, but it's inefficient.

REPLIES:

William D. Latinette (SIG 26/MESS 12): I've checked the Kermit server (@Univ.Toledo), but haven't found a Kermit for HP BASIC. There's one in PASCAL I'm planning to try, and I may give the author a call to see if he knows anything. I know that many HP 200/300 users would appreciate a decent Kermit.

Roy A. McMorran (SIG 26/MESS 13): A version of Kermit written in HP BASIC (5.0 or higher) has recently become available. Written by Andrew Campagnola of HP, it's available from KERMIT Distribution, Columbia University, Center for Computing Activities, 612 W. 115 St., New York, NY 10025; or INTEREX, 680 Almanor Ave., Sunnyvale, CA 94086-3513.

SLAVE PRINTER

COMMENT:

David W. Pinkston (SIG 41/MESS 11): I noted with interest the slave printer problem reported by Carole Cotter in the October issue (SIG 41/MESS 7). The so-called "Command Completion

How To Use ARIS/BB

Subscribers to *HP PROFESSIONAL* can call up our online bulletin board and log into ARIS/BB, our Automated Reader Information Service. In ARIS/BB, you can download programs from this publication, communicate with our editors, request a change of address, find additional information about advertisers, order books and back issues, check the guidelines for submitting articles, take a peek at our editorial calendar for the year and communicate with other HP users.

To log in, you'll need your subscription number from your mailing label. Set your terminal to seven data bits, one stop bit and space parity, or eight data bits, one stop bit and no parity. Set your terminal emulation to VT100 and dial:

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After the CONNECT hit Return two or three times.

The ARIS/BB symbol appears at the beginning of each program that's downloadable. Use these recommendations at your own risk. Professional Press is not liable for any damages to your system that might be caused by the hardware, software, programs or procedures discussed here.

XMODEM and KERMIT are available.

SIG Identification

The SIG categories referenced in this month's *ARISTALK* are:

23 PCs
24 Peripherals
26 Communications/Networking
41 Applications

Codes" have irritated us for more than five years. I think Doug Shelton is correct in his appraisal, even though we have no MPE/ XL experience, either. I believe the problem is related to the timing of the code. We found ourselves having to endure an "S" printed on the screen for each line of print sent to the printer. Our salvation came with the purchase of the optional *HP 700/94 Terminal Reference Manual* (5957-9982). Read-

ing pages 5-7 and 2-12/14 provided a workaround.

We disregard the command completion code entirely. By turning on the G and H handshakes [InhHndShk (G) and Inh DC2 (H) = "YES"] in the terminal configuration, we found the COBOL accept statement to be unnecessary. I have a one-page source program, which only took me three years to write. This program turns on the G and H inhibits and record mode, reads and writes the data to stdlist, and turns off the inhibits and record mode.

These queries have no replies. If you can respond to any of them, please dial up ARIS. We need your input. —Anne Schrauger

SCSI ON VECTRAS

QUERY:

Tom Kuiper (SIG 23/MESS 24): I have one of the early Vectras, known lovingly as the Classic A configuration, although the ROM set is quite up-to-date (two years old). I'd like to add a SCSI adapter. The HP Product Center doesn't know if this will work. Has anyone tried this?

HP apparently discontinued its Vectra compatibility guide some years ago.

SCALES TO HP 3000

QUERY:

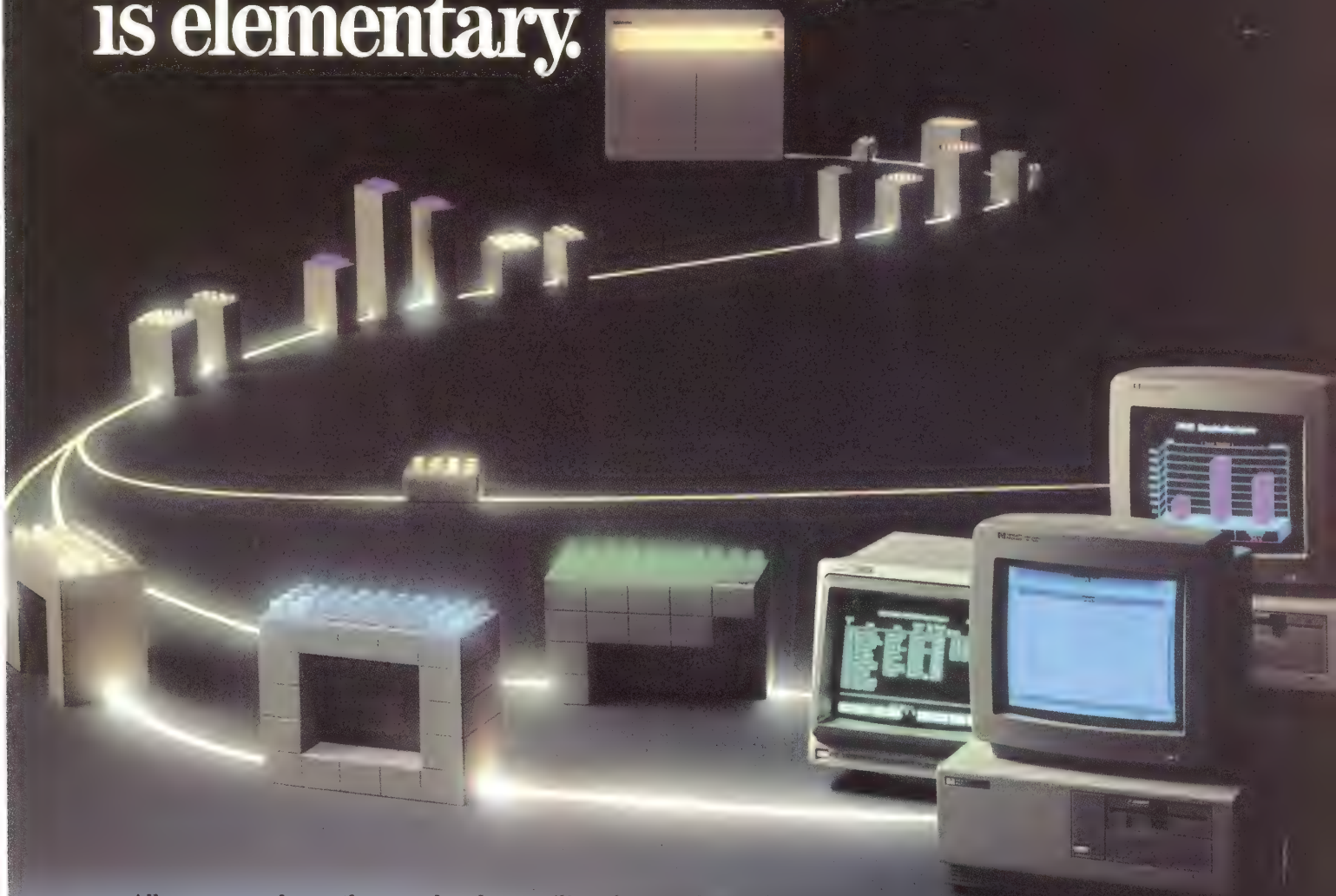
Jerry McMurray (SIG 24/MESS 3): I'm attempting to connect a Fairbanks H90 scale to an HP 3000 via an input to an A700 terminal while allowing input from the keyboard and printing to an attached spool printer. Any suggestions?

ME10 USERS IN PLASTICS

QUERY:

Rudy Leon (SIG 41/MESS 10): Are there any ME10 users out there in the plastics industry? Specifically, anyone using it for injection mold design?

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INDUSTRY WATCH

Peggy King

tively to executives?" This question, brought up at the September INTEREX Roundtable discussion, stirred a great deal of response from both the audience and participants.

Mike Leavell, HP vice president and director of U.S. field operations for the marketing and international sector, told the audience, composed mainly of MIS professionals and systems analysts, to expect changes with the implementation of HP's Coach Program (a new sales methodology to bring in larger deals and more profitable accounts).

Why should data processing professionals be concerned about the type of sales pitches the top management at their companies hear from HP? It didn't take long to learn why.

The DP departments may be sold on HP because of the company's quality products and excellent customer support. Nevertheless, when it comes time to switch systems, the idea of a 100 percent HP shop is hard to sell to executives because there are many who perceive HP only as a niche solution.

HP has no problem selling equipment to Fortune 1000 companies. Almost all of these big spenders are HP accounts for one product or another. However, HP needs to have more corporations follow American Airlines' lead and purchase several million dollars worth of equipment, software and services over a span of several years.

The HP Coach program is designed to do just that.

Changing The Technical Sale

Many HP salespeople have a technical background, and a number of them have

HP's New Sales Strategy Targets Executives

From The Computer Room To The Board Room

"When is HP going to develop a strategy for selling effec-



worked as engineers before moving into sales. As a whole, the sales force is noted for its excellent product knowledge, and they know their way around computer rooms. The rub is that many of them are less assured when they have to make their pitches in board rooms.

It's not surprising that HP has been slow to change from the technology sell. Some of the company's most successful products have been the results of technological breakthroughs, and HP's marketing departments have felt the need to explain the technology in order to sell the product.

For example, when the RISC-based multiuser Series 800 computers were introduced two and a half years ago, the sales pitch concentrated on explaining RISC architecture, describing advances in semiconductor technology and explaining the manufacturing advances that made it possible for HP to sell more compute power for less money than its competitors.

What was missing was the message about how HP's Precision Architecture was a better business solution than anything the other vendors could offer. Now, the HP Coach program is working across product disciplines to change the HP sales pitch from a *technology* sell to a *solutions* sell.

Ernst & Young consultants helped HP

to design a program to provide benefits analysis for customers and prospective customers. The program includes training in the Office Automation Marketing Group, the commercial (HP 3000 systems) sales representatives, the technical sales force and the test and measurement sales force. Systems engineers (SEs) and marketing professionals also are receiving training so that they'll be able to support the sales representatives in preparing and presenting benefits analysis to executives.

Sales representatives are instructed to listen and learn about the client or prospect's business before offering a set of solutions. A sales force that is accustomed to talking with data processing professionals needs both training and practice in how to make contact with executives and how to get them to agree to having an HP sales team deliver a benefits analysis.

The HP Coach program provides four days of training. At the commercial sales training session, a group of retired CEOs was invited to give the salespeople a chance to experience some very realistic role playing. In addition, salespeople learn how to prepare and present a benefits analysis to an executive. Also, training includes instruction on how to conduct interviews and focus groups with middle and lower management, how to

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compute the payback the company could realize by going with HP solutions, and how to present the findings to management.

When a sales representative contacts an executive about a benefits analysis, the only pitch delivered is for the free benefit analysis itself. If the executive agrees to it, the sales representative then conducts a Critical Success Factor (CSF) interview. The salesman spends approximately one hour to find out what the top executive considers to be the most crucial factors in the business and then asks him to rank these factors. Then the executive is asked to designate a person to be in charge of organizing the focus group meetings with members of middle and lower management. The sales representative works with the appointed person to arrange interviews with three to six midlevel managers in a focus group.

After the series of meetings with the customer or prospective customer, the sales representative takes the information and uses it to plan a presentation to top management. In preparing for the presentation, the sales representative can make use of the industry profiles prepared by marketing groups.

According to Jeff Williams, HP's manager of field education and training for the U.S. sales force, HP and its value added businesses (VABs) both benefit from the new approach to selling. Now, sales and marketing people communicate more because HP Coach gives sales and marketing employees a chance to help each other in their jobs. Sales representatives can make use of the industry profiles that the marketeers prepare. Marketeers benefit from hearing about actual customer needs. Systems engineers who used to be doing maintenance are now consulting partners in the sales process. VABs benefit because the sales representatives usually suggest third-party products as part of a business solution.

Perhaps by the next INTEREX conference, HP will be able to assure the data processing professionals that their salespeople can sell in the board room as well as in the computer room. ■

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CDs Replace Magnetic Tape

LaserRELEASE Expedites Software Distribution

HP has announced HP LaserRELEASE, a new program for distributing operating system and subsystem software for HP 3000s.

HP LaserRELEASE uses compact discs (CD-ROM) instead of magnetic tape as the software-distribution media. It expedites software distribution, simplifies the installation process and lowers costs.

The HP LaserRELEASE program for the HP 3000 MPE V systems includes a new

software-installation tool, a new HP-IB (IEEE-488) CD-ROM drive and software that resides on a CD. The program includes a disc with more than 100 MPE V software products and the entire operating system.

HP expects the distribution of software on CD-ROMs to expedite the software-manufacturing process, which in turn places the software update in the customer's hands in less time.



HP LaserRELEASE, a new program for distributing operating system and subsystem software for the HP 3000, uses CD-ROM instead of magnetic tape as the software-distribution media.

InCase, USS Announce Joint Distribution Agreement

EnGarde And Security Plus Offer Security Utilities And Access Control

InCase Corp. (Redwood City, CA) and Unified Software Systems (USS), a division of Unified Industries Inc. (Springfield, VA), have announced a joint agreement to distribute each other's software in the U.S. and Canada.

Recognizing the compatibility of EnGarde, a security audit utility and Security Plus, an access control and security

management system, the two companies have taken this step to enhance their offerings in the HP 3000 security market.

Security Plus centralizes the control of data processing operations by limiting user access and protecting modems and terminals through password protection. It also helps to maintain and control MPE's own security functionality.

EnGarde is a security analysis program that provides easy-to-read reporting of potential security problems on an HP 3000. Checking for security "holes" in accounting structure and file access rights, EnGarde provides four distinct reports to the system manager: an historical tracking report, a system detail report, an account-by-account detail report and, recently introduced, the EnGarde Matrix report.

Contact InCase Corp., 2055 Woodside Rd., Suite 171, Redwood City, CA 94061; (415) 369-1941.

Circle 370 on reader card

HP Bundles Productivity Tools With Apollo Workstations

Provides Practical Desktop Solution For Educational Marketplace

Hewlett-Packard, through its Apollo Division, has announced the bundling of its Apollo personal workstations with key software packages for the educational market.

Available on the Apollo Series 2500, Series 3000, Series 3500 and Series 4500 workstations, this integrated solution incorporates Wingz spreadsheet software from Informix Software Inc.; iWrite, iPaint and iDraw desktop publishing software from Island Graphics Corp.; and Mathematica from Wolfram Research Inc.

In addition, HP offers the

Domain PC Emulator (DPCE) free with every Apollo desktop workstation sold to users in higher education. An important tool for colleges and universities, DPCE provides workstation users with the ability to run PC applications in a window in a networked-computing environment. When combined with software from Informix, Island Graphics and Wolfram Research, this complete workstation package provides a practical desktop solution for the education market.

HP Unveils Team Computing Program

Provides Full Processing Power To All Computers On Network

Hewlett-Packard has introduced the Team Computing program, an approach to configuring computer products on a network to make the full processing power of every computer available to anyone on the network.

Focused on meeting the needs of engineering, scientific and other project teams, the Team Computing program encompasses existing and newly announced products that allow customers to configure their own multivendor networks in a way best suited to their specific needs.

It incorporates products

that operate on standards-based networking systems, such as HP AdvanceNet, to help customers achieve computing solutions that go beyond network connectivity.

Team Computing is ideally suited to organizations that need to integrate project-team members who share common work objectives and rely on computers and application programs from different vendors to get their work done.

The first Team Computing components are:

- Task Broker, a new distributed-computing application for end users.

- NCS (Network Computing

System) for all HP-UX system workstations.

- NCS-based system administration applications for all HP workstations.

- Preconfigured X Windows

environment to provide the same appearance and behavior in HP and Apollo workstations and X Terminals by using the OSF/Motif graphical user interface.

HP Moves CD-ROM Technology To UNIX Platform

LaserROM/UX Features Motif Graphical Interface

HP has announced HP LaserROM/UX, a product that enables users in a UNIX system environment to perform full-text keyword search and retrieve customer support information from a CD-ROM.

The retrieval software and subscription service lets users simultaneously access the equivalent of more than 20,000 pages of online information related to the operation of HP 9000 Series 300 and Series 800 HP-UX computers.

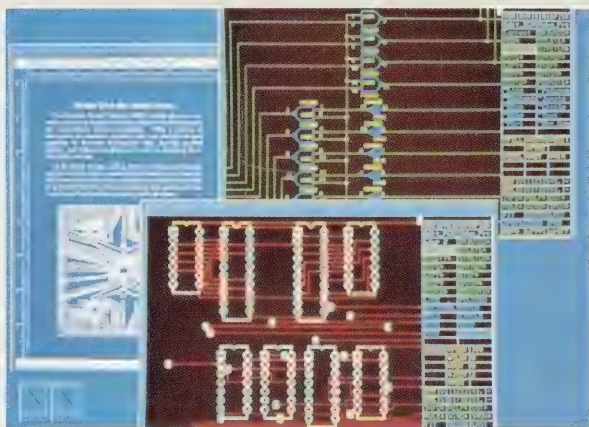
As one of HP's first applications to implement the Open

software Foundation's OSF/Motif user interface, HP LaserROM/UX software features a Motif graphical user interface for bit-mapped displays as well as a terminal interface for users with character-mode alphanumeric displays.

The subscription service includes information pertaining to the HP 9000 Series 300 and Series 800 computers. Prior to this announcement, the software operated strictly in an MS-DOS environment. HP will update the subscription service on a bimonthly basis.



The paper equivalent of the HP LaserROM/UX subscriber occupies approximately 20-linear feet of shelf space. Now, information can be accessed from one compact disc.



HP EGS is an entry-level, computer-aided design (CAD) package for printed-circuit-board layout.

HP Engineering Graphics System Available On UNIX

Designed As An Entry-Level CAD Package For Printed-Circuit-Board Layout

Hewlett-Packard has announced that a UNIX system-based version of the HP Engineering Graphics System (HP EGS) will be available on HP 9000 Series 300 workstation.

HP EGS is an entry-level, computer-aided design (CAD) package for printed-circuit-board layout. Optional modules can be added to the basic product for schematic drawing, mechanical drafting, hybrid-circuit design or general-purpose artwork.

HP EGS runs under HP-UX 7.0 in X Windows System Version 11 or in full-screen mode. It's available at a base U.S. list price of \$4,000 and optional modules range from \$2,000 to \$5,000 U.S. list.

Hewlett-Packard Chooses Spectragraphics Products

CommSet To Provide 5080-Compatible Graphics

Spectragraphics Corp. (San Diego, CA) has announced a development agreement with Hewlett-Packard through which Spectragraphics will tailor its CommSet products to provide 5080-compatible high-performance

graphics and IBM mainframe access to HP's line of engineering workstations.

Products developed under the agreement will combine Spectragraphics' CommSet IBM-compatible communications and graphic technology

with HP's Model 350 SRX engineering workstations for CAD and CAE applications. This connectivity will provide HP users access to CAD applications such as CADAM

and CATIA and 3270 environments under MVS/TSO or VM/CMS operating systems, plus high-speed file transfer functions.

Innovus, SCI Announce Strategic Relationship

Software Developers To Port Products To HP MPE V, XL and HP-UX Systems

Innovus Inc. and Software Conversion (SCI) have entered into an alliance to assist software developers in porting their products to HP computer systems.

Innovus provides software migration services and specializes in both the logistical and technical aspects of porting software to HP computers running any of the MPE V, MPE XL and HP-UX operating systems.

SCI has established an investment fund to assist soft-

ware companies by providing capital for the migration of their existing software products to new computer platforms and/or operating systems. SCI recovers its investment through a royalty on the sale of converted software and thus provides "off-balance-sheet" funding without equity dilution.

Contact Innovus Inc., 200 James St. S., Suite 204, Hamilton, Ontario, L8P 3A9; (416) 529-8117.

Circle 367 on reader card

Solutions Suppliers To Support Apollo Series 2500

New Workstation Suited For CASE, DBMS, AI And Electronic Publishing

Leading solutions suppliers, representing a broad range of market segments, have announced their support for the Series 2500 personal workstation.

The companies are: Cadre Technologies, Interactive Development Environments, Interbase Software Corp., Neuron Data, Oracle Corp.,

Frame Technology, Interleaf Inc., Applix Inc., SAS Institute Inc. and Solfram Research Inc.

The new Series 2500 personal workstation was designed for the computer-aided software engineering (CASE), database management systems, artificial intelligence, electronic publishing and professional-productivity market segments.



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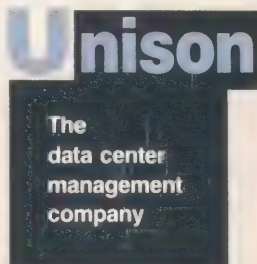
MAESTRO automatically manages a variety of tasks which are usually performed manually, such as integrating user job requests, scheduling production, preparing job streams, and documenting job status. In fact, MAESTRO is

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MCAD/MCAE Solutions Suppliers Support Apollo Series 3500/4500 Workstations

*Systems Offer Solution Suppliers Industry-
Standard Platform For Desktop Marketplace*

McDonnell Douglas Systems Integration Co., PDA Engineering Inc. and Structural Dynamics Research Corp., providers of mechanical computer-aided design and engineering (MCAD/MCAE) solutions, announced support for the desktop visualization system introduced by HP's Apollo Division.

The Apollo Series 3500 and Series 4500 desktop visualization systems offer solutions suppliers an industry-standard platform that delivers what HP believes to be the highest 2-D and 3-D graphics performance

in the desktop marketplace.

MCAD/MCAE techniques are used by engineers to decrease time-to-market and improve quality for products in industries ranging from aerospace and defense to consumer electronics.

The Apollo Series 3500 and Series 4500 desktop visualization systems allow intensive numerical calculations and graphics renderings to take place simultaneously, thereby increasing the productivity of the design-engineering processes.

Software Developers Endorse HP LAN Manager/X

*Cooperative Computing Optimizes
Use Of Workstations, PCs*

HP has announced that four of the leading database independent software vendors are writing database applications that take advantage of the HP LAN Manager/X network software for cooperative computing.

Also, HP LAN Manager/X software for HP 9000 technical computers now is being shipped and will be accompanied by HP LAN Manager/X software for HP-UX system-based HP Vectra personal computers in the future.

Informix Software Inc.,

Oracle Corp., Relational Technology Inc. and Sybase Inc. are the initial ISVs endorsing the software. These four companies account for 85 percent of the relational database software market for UNIX systems, according to the Gartner Group in its May 1989 Software Management Strategies report.

In addition to relational database developers, HP plans to work with leading developers in the areas of communications and personal software to expand the range of distributed applications and capabilities available to HP LAN Manager/X users.



An HP 9000 will replace the aging computer at Hoechst Celanese's Shelby, NC, automated warehouse.

Retrotech To Upgrade Hoechst Celanese Warehouse

New HP 9000 Manages Local Inventory

Retrotech Inc. (Fairport, NJ) has been awarded a contract for over one half million dollars to upgrade Hoechst Celanese's Shelby, North Carolina, automated warehouse (AS/RS).

The project includes the replacement of the aging warehouse computer with an HP 9000 computer. The HP 9000 will operate under UX. All applications will be written in Fortran. The new computer system will manage local inventory, the eight aisles of Store/Retrieve (S/R) machines and the carton infeed conveyor. The new computer will receive information from and update HP 9000 host through a local area network (IEEE 802.3).

Contact Retrotech Inc., 80 O'Connor Rd., Fairport, NY 14450; (716) 377-2800.

Circle 366 on reader card

HP Introduces CD-ROM For Workstations

Incorporates HP-IB Interface

HP has announced a standalone CD-ROM drive designed for workstations and computer systems. The drive, called the HP Series 6100 Model 600/A, incorporates an HP-IB (IEEE-488) interface with the Command Set 80 (CS/80) protocol.

This allows the user to connect the drive directly to HP-IB systems without a special controller card. Prior to the Model 600/S, most CD-ROM drives either incor-

porated a special controller card or a SCSI interface for use with a personal computer. Features include:

- CD-ROM formats — reads industry-standard CD-ROM discs.
- data caching — supports high-speed burst and continuous data-transfer rates.
- data security — offers software and data protection techniques; and.
- audio output — plays industry-standard digital stereo recordings.

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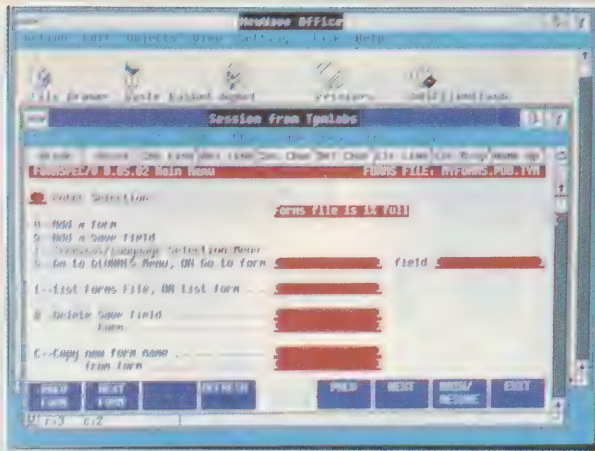
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CIRCLE 112 ON READER CARD



Session from Tymlabs runs as an advanced HP NewWave application, providing access to data, applications and storage capacity of any HP host computer.

Tymlabs Announces Session For Windows Version 1.1

Acts As An Advanced HP NewWave Application

Tymlabs Corp. has announced Version 1.1 of Business Session for Windows, a Microsoft Windows-based HP2392 terminal emulator for IBM PCs, HP Vectras and compatibles. The new version is an advanced HP NewWave application that can be installed as an "object" under NewWave, and runs in its own window.

This version also allows you to run multiple sessions on the HP host at the same time, each through a different port. The available ports are COM1, COM2, HP Advance Net, four Eicon ports and two Int14 ports. Also new in this version is support for file transfer over X.25 and other non-TERMTYPE 10 connections, and support for HP's EDCL protocol.

Contact Tymlabs Corp., 811 Barton Springs Road, Austin, TX 78704; (512) 478-0611

Circle 365 on reader card

IBM Adopts Apollo's NLS

Software To Be Used With IBM's CAD/CAM/CAE Products

HP has announced that IBM has licensed Apollo's Network License System (NLS) for use with IBM's CAD/CAM/CAE products.

NLS is the latest software-

licensing product that runs over Apollo's industry-standard Network Computing System (NCS).

NLS is a new concept in

licensing that provides software suppliers with the ability to meet the licensing-flexibility requirements of networked end users. Through NLS, end users can license their software based on the maximum number of simultaneous users. NLS also offers a means of assuring authorized use of software.

NLS acts as a librarian, allowing users to borrow and use software licenses as they need them. A copy of the software application is installed on a computer and a software license is issued from the license-server node when the end user wants it. After a user has finished using an appli-

cation license, the license is made available to other network users.

NLS includes a graphics interface, which monitors the use of licenses, generates usage reports and installs new licenses. Consistent with its open-system approach, HP's Apollo Division ships and supports version of NLS for both Sun Microsystems and DEC VAX/VMS systems.

NLS works in conjunction with NCS, a set of advanced software tools that allow users to distribute parts of a single-application program to other computers best suited for specific tasks.

New VAR To Install Freight-Link On HP 9000

Accounting And Operations Software Aids Fullerton Motor Truck Services

Creative Systems Corp. (Burr Ridge, IL), a new HP VAR, will make its software solution for the trucking industry available on HP 9000 HP-PA minicomputers and HP Vectra ES/12 personal computers.

Freight-Link, Creative Systems Corp.'s integrated accounting and operations software, has been installed on an HP 9000 Model 815S minicomputer at Fullerton Motor Truck Services (Chicago, IL), a contract carrier of steel.

Freight-Link modules are available for dispatching, freight billing and revenue analysis, payroll, asset depreciation, driver logs and certifications, permits, driver management, fuel and mileage

reporting, vehicle maintenance, accounts payable and receivable and general ledger. These modules can serve as standalone programs or as part of a fully integrated system.

Freight-Link operates under the HP-UX operating system on HP 9000 Series 800 multiuser minicomputers and under the Xenix operating system on HP Vectra PCs.

Note: If you have any questions regarding a Hewlett-Packard announcement mentioned in *News & Trends*, please contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.



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LaserRX/UX Simplifies HP-UX System Management

HP has announced HP LaserRX/UX, a CD-ROM-based performance-management tool for HP-UX 7.0.

The tool is designed to simplify and improve the management of HP-UX systems, particularly in commercial or multiuser environments. You can continually monitor and evaluate information critical to maintaining peak computer-system performance. This information includes CPU activity, disc I/O activity, response time and system throughput on global, as well as application levels.



HP now offers LaserRX/UX, a CD-ROM-based performance-management tool for HP-UX 7.0.

CADmate Designed For Mechanical Applications

Versatec has introduced a low-cost, high-performance monochrome electrostatic plotting system, CADmate. Priced at \$14,000, it's designed to replace high-performance pen plotters for mechanical and architectural applications.

CADmate provides near-laser quality, 300 ppi drawings, in 36-inch-wide format. It

accepts HP-GL data format and is plug-compatible with HP 7586 pen plotters.

Contact Versatec, 2710 Walsh Ave., Santa Clara, CA 95051; (800) 538-6477; in CA (800) 341-6060.

Circle 387 on reader card

Security Analysis Tool Adds New Reporting Functionality

InCase Corp. has released Version 3.0 of EnGarde, a system security analyzer for the MPE V and MPE XL operating systems. A new set of matrix reports has been added as well as new commands that provide greater flexibility for easy use of EnGarde as a system management tool.

The product is designed to assist system managers and account managers in maintaining tight security on HP 3000s. The new EnGarde matrix reports were developed at the request of HP to replace the UTIL5020 reports developed by HP for use by its internal auditors and system managers. The reports detail system directory information in a tabular format for quick reference. The 3.0 release provides six of these reports, each providing information on different aspects of system security.

The first copy price is \$1,495 for the MPE V system and

\$1,995 for the MPE XL version.

Contact InCase Corp., 2055 Woodside Rd., Suite 171, Redwood City, CA 94061; (415) 369-1941.

Circle 393 on reader card

Analyzer488 Simplifies Troubleshooting

IOtech Inc. has developed a new IEEE 488 bus analyzer, Analyzer488, making trouble-

shooting IEEE 488-based test systems easier while including several capabilities not found in previous analyzers. The IEEE analyzer operates in several modes to allow easy monitoring and analysis of IEEE 488 bus systems.

Although Analyzer488 is a standalone benchtop device with a keypad and display, its RS-232 port allows it to be operated from any computer or terminal with a serial port. Included with Analyzer488 is Analyst488, a companion software package for the IBM PC, PS/2 and compatible computers that provides complete control of the analyzer through intuitive pull-down menus and pop-up windows.

Analyzer488 has three modes of operation: as a bus monitor/analyzer, as a bus controller and as an instrument simulator. Analyzer488, including the Analyst488 software, is priced at \$1,495.

Contact IOtech Inc., 25971 Cannon Rd., Cleveland, OH 44146; (216) 439-4091.

Circle 383 on reader card

Intelligent Tape System Performs Local Backup

IEM's high capacity (2.3 GByte) Intelligent Tape System for HP 1000, 3000, 9000 computers now is priced at \$7,995. Attach the unit (via an HP-IB cable) to one or more CS-80 protocol hard discs to perform unattended backup of up to 32 disc volumes on the HP-IB bus. Local backup operations can be performed as needed, or scheduled to take place on regular basis.

When connected to a host computer, the unit also can be used as a directly connected tape drive and emulates the HP 7974 streaming tape drives.

Contact IEM Inc., P.O. Box 8915, Fort Collins, CO 80525; (800) 321-4671.

Circle 365 on reader card

SIR/DBMS V.2.2 Available On HP 9000 Workstations

Innovus Inc. and SIR (USA) Inc. have announced SIR/DBMS Version 2.2 for the HP

9000 Series 800 and 300 workstations running HP-UX. SIR/DBMS provides an alternative to commercially oriented database products for scientific research and engineering users.

SIR/DBMS features embedded descriptive statistics, tabulation capabilities, report writers, plus gateways to standard statistical packages such as SPSS, SAS and BMDP. SIR/DBMS recognizes both NULL and user-specific missing data items. It includes both an ANSI standard SQL as well as full PQL, an active data dictionary, screen-oriented application generator (FORMS), online help and an interactive schema generator.

Contact Innovus Inc., 200 James St., Suite 204, Hamilton, Ontario L8P 3A9; (416) 529-8117.

Circle 395 on reader card

'Headlines in a Cartridge' Features Large-Size Fonts

Pacific Data Products has announced its newest product, "Headlines in a Cartridge," for laser printers. The cartridge has 18 large-size big-mapped fonts and features Helvetica and Times Roman style fonts in both bold and italic weights and includes the sizes most widely used for display.

Printer drivers are included for word processing and desktop publishing programs. The cartridge, priced at \$399, is fully compatible with HP LaserJet Series II/IIID, HP LaserJet Plus, HP LaserJet 500 Plus, CanonLBP-811 and Olivetti PG-108/PG-208.

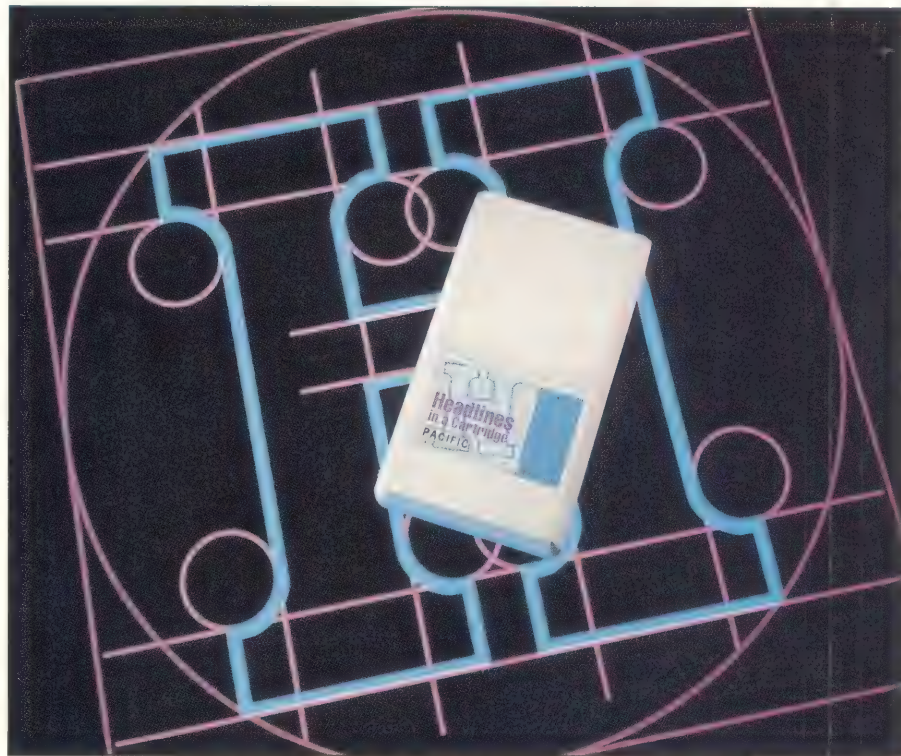
Contact Pacific Data Products, 6404 Nancy Ridge Dr., San Diego, CA 92121; (619) 552-0880.

Circle 396 on reader card

Orion Expands Apartment Management System

Orion Systems Technology Inc. has added an optional Accounts Payable module to AM/3000-II, its multiunit apartment management system for the HP 3000. The Accounts Payable module is fully integrated with Tenant Lease Processing and the General Ledger.

Features include the ability to handle manual checks as well as checks issued normally, and the reversal of voided/returned checks. You may select either cash or accrual basis for accounting. Complete vendor and



"Headlines in a Cartridge" for laser printers offers 18 large size bit-mapped fonts.

check histories are retained for analysis and tax reporting.

The newest module provides management companies, owners and developers of multiunit apartment projects of 1,000+ units with all the necessary components to manage and control their properties.

Contact Orion Systems Technology Inc., 325 S. El Dorado, Suite 102, Mesa, AZ 85202; (602) 894-6983.

Circle 372 on reader card

Windowing Tool Available For HP 3000 Applications

Software Research Northwest Inc. has announced WINGS, an application development tool for windowing across the entire line of HP computers.

Developed as part of an on-going joint venture with Denkart NV (Kontich, Belgium) and Allegro Consultants Inc. (Redwood City, CA), WINGS is an application development tool providing a standard user interface on HP 3000s, HP 9000s and the Vectra PC. WINGS operates identically under MPE XL, MPE V, HP-UX

and DOS.

Based on an extended implementation of the X/Open CURSES standard, WINGS supports windowing, forms handling, menuing and file browsing. It's built as a set of layered software components. The basic increment is an extended implementation of X/Open CURSES for windowing. This tool permits programmers to define multiple rectangles on a screen, with each operating as separate window that can overlap or be hidden at will.

All software licensing for WINGS will be based on CPU size.

Contact Software Research Northwest Inc., 17710-100th Ave. SW, Vashon Island, WA 98070; (206) 463-3030.

Circle 376 on reader card

ASP Computer Products Enhances ServerJet

ASP Computer Products has announced an enhanced version of ServerJet that expands the capability of the HP Series II and IID LaserJet printers by allowing more users instant and simultaneous access to the printer

RGB Technology's RGB/VIEW 2000 Video Display Controller now can be operated under the X Window system.



at 115,200 baud. Computers now can transfer serial data to the HP LaserJet at a rate approximately 12 times faster than standard serial transfer.

The ServerJet is able to accept and spool data any time and from all users, even when the printer is busy printing another document. Several models are available to support six, seven or 10 users. A special model can connect six computers to the HP LaserJet and a second printer.

ServerJet comes standard with 256K of internal memory, expandable to 1 MB, and is priced at \$495.

Contact ASP Computer Products Inc., 1026 W. Maude Ave., Suite 305, Sunnyvale, CA 94086; (408) 746-2965.

Circle 382 on reader card

RGB/VIEW Supports X Window System

RGB Technology has announced that its RGB/View 2000 Video Display controller now can be operated under the X Window System.

The RGB/View 2000 Display Controller integrates text and graphics with real-time composite video and RGB component video signals on a workstation monitor. The real-time video is displayed as a window on the workstation screen. The video window can be positioned, scaled, clipped and overlaid with computer graphics.

The product supports any high-resolution display on any workstation, including systems from HP/Apollo. The RGB/View doesn't

impact the workstation's CPU or frame buffer performance, nor affect is operation in any way.

Contact RGB Technology, 2550 Ninth St., Berkeley, CA 94710; (415) 848-0180.

Circle 381 on reader card

Bering Industries Announces 650-MB MO Disc Drive

Bering Industries has introduced a 650-MB Magneto-Optical (MO) Disc Drive for HP computers. The OptiPac 7600 system is 100 percent hardware- and software-compatible with all HP computers using the HP-IB interface and supporting CS/80 and SS/80 command sets. These include the HP 9000 Series 200/300/500, HP 1000 and HP 3000

systems.

The OptiPac 7600 has high storage capacity and rapid access time and complies with ANSI/ISO standards. It's priced at \$7,790.

Contact Bering Industries, 246 E. Hacienda Ave., Campbell, CA 95008; (408) 379-6900.

Circle 394 on reader card

Mastersoft Upgrades Its File Conversion System

Mastersoft Inc. has begun shipping Word For Word Professional, Version 4.1, an expanded version of its file conversion system. The latest release adds document conversion support for 15 new word processing formats, including a new "Stripped" ASCII, and the ability to convert Lotus 1-2-3 spreadsheet files.

Version 4.1 now supports 58 distinct file formats. Support has been added for HP AdvanceWrite Plus.

The additions of integrated software support and spreadsheet import/export capabilities allow "cross-application" conversion solutions.

Contact Mastersoft Inc., 4621 N. 16th St., Suite B210, Phoenix, AZ 85016; (602) 277-0900, (800) 624-6107.

Circle 371 on reader card

ConnectLAN 200 Adds Remote Token Ring Brouter

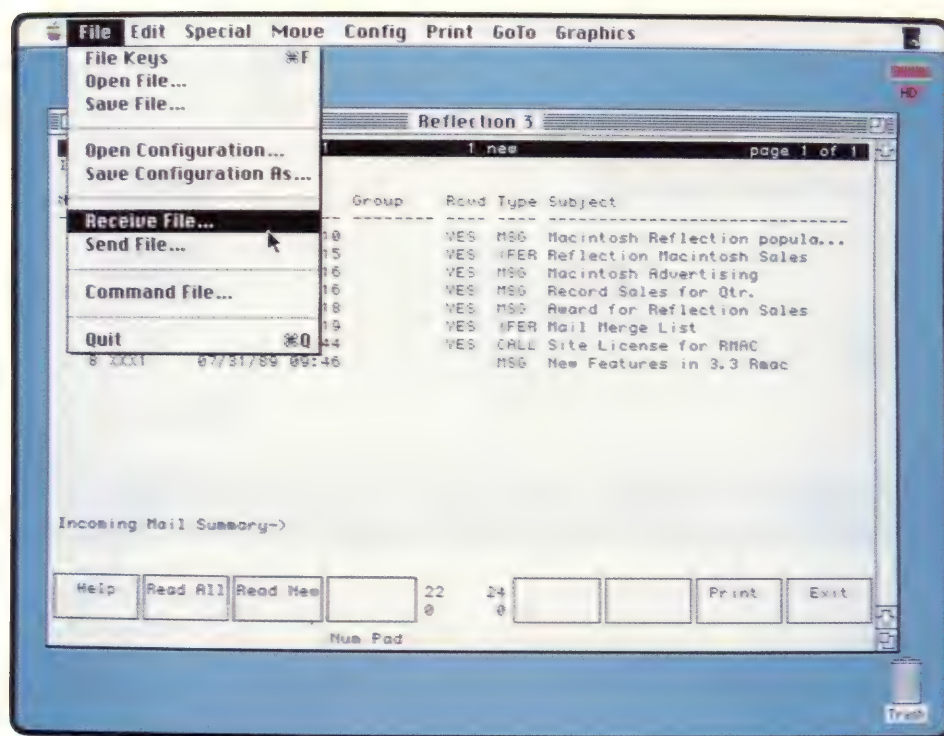
Halley Systems has introduced the ConnectLAN 211 Remote Token Ring Brouter. The ConnectLAN 200 series products can support an aggregate throughput in excess of 3.2 Mbps per second. The ConnectLAN 211 interconnects 802.5 compatible networks and

Continued on page 86.



Bering Industries' offers the OptiPac 7600 650-MB MO disc drive.

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CIRCLE 240 ON READER CARD

TECHNOLOGY TIMELINE

In celebration of 10 years in the computer industry, Professional Press, publisher of *DEC PROFESSIONAL*, *VAX PROFESSIONAL*, *HP PROFESSIONAL* and *MIDRANGE SYSTEMS*, presents a timeline of milestones in the history of Digital, Hewlett-Packard and IBM computing. The timeline includes major events in Professional Press' 10-year publishing history.



'79 *RSTS PROFESSIONAL* introduced at the San Diego DECUS meeting. The quarterly publication reached 10,000 subscribers.

'77 The VAX-11/780 is the first member of the VAX computer family.



'81 Digital breaks the \$3 billion mark in sales.

'66 HP's first computer is developed as a controller for its family of programmable instruments.

'57 DEC founded.

'39 HP founded.

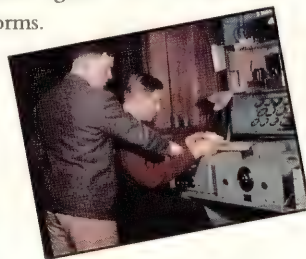
'77 System/34.

'78 System/36 is a follow-up to System/34.

'72 The HP 3000 minicomputer uses one operating system, MPE, and expands performance in business applications.

'60 The PDP-1 is the world's first small interactive computer.

'60 The HP oscilloscope makes use of a sampling technique to view faster digital waveforms.



'80 *RSTS PROFESSIONAL* becomes bimonthly.

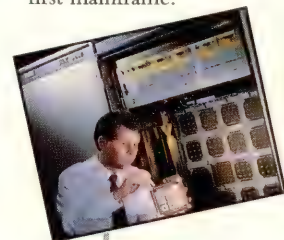
1910 1940 1960 1965 1970 1975 1980 1981

'14 IBM founded.



'87 From The Lab:
This column devoted to products tested and evaluated in our Laboratory and Testing Center appears in *DEC PROFESSIONAL* (1987), *HP PROFESSIONAL* (1989) and *MIDRANGE SYSTEMS* (1989).

'89 The VAX 9000 is Digital's first mainframe.



'89 The DECstation 3100 takes Digital into RISC-based computing.

'89 HP celebrates its 50th anniversary. The garage in which the company started is named the birthplace of Silicon Valley.

'89 HP purchases Apollo Computer and becomes leader in the workstation market.

'89 OfficeVision is the first step in IBM's all-encompassing SAA strategy.

'85 The MicroVAX II is a powerful supermicrocomputer that incorporates the revolutionary "VAX-on-a-chip."

'85 *VAX/RSTS PROFESSIONAL* becomes *VAX PROFESSIONAL*, a bimonthly technical journal for VAX/VMS users that reaches 10,000 subscribers.

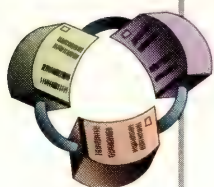
'85 Professional Press publishes its first book, *Introduction To VAX/VMS*, by Terry Shannon. This self-teaching text explains how to use VAX/VMS systems.

'87 The VAXstation 2000 is Digital's lowest-cost workstation.

'87 *HP PROFESSIONAL* introduced. This monthly publication for professional users and managers of HP's commercial and technical computer systems reaches 35,000 subscribers.



VAXclusters are introduced, a process for linking VAX processors in a loose processor coupling.

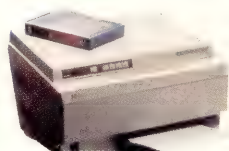


'83 System/38.

1982 1983 1984 1985 1986 1987 1988 1989

'82 Digital celebrates its first 25 years, during which more than 360,000 computers were shipped.

'84 The HP LaserJet is a personal desktop laser printer.



'82 *DEC PROFESSIONAL* introduced. This monthly solutions-oriented magazine for DEC computing professionals reaches more than 98,500 subscribers.



'86 Introduction of the VAX 8800 and midrange VAX 8200/8300.

'86 Local Area VAXcluster systems extend distributed computing to the workgroup.

'86 ARIS/BB: An on-line bulletin board for *DEC PROFESSIONAL* (1986), *VAX PROFESSIONAL* (1986) and *HP PROFESSIONAL* (1989) subscribers.



'88 AS/400 unveiled as a long-anticipated upgrade to the Systems/3X.

'88 HP NewWave software environment allows development of advanced, easy-to-use end user products.

'88 *MIDRANGE SYSTEMS* introduced. This biweekly news-oriented tabloid for IBM System/3x and AS/400 users reaches 40,000 subscribers.



HP Targets PC Graphics Market

Two New Add-On Cards Boost PC Performance

Years back when Hewlett-Packard was known primarily as a manufacturer of superbly designed electronic instruments, there was a joke that HP stood for "high price." Low-volume, high-quality products in these unusual markets couldn't be made cheaply, designers thought — and so they weren't.

With that background, it took a while for HP to find ways to achieve both high quality and low price. To HP's credit, they've rarely slipped on quality, and prices have worked their way down, particularly in volume markets. HP's new Intelligent Graphics Controller (IGC) 10 and 20 cards for high-resolution personal computer (PC) graphics are good demonstrations that a multibillion-dollar firm can make inexpensive products that reach high levels of performance.

Shipments of the IGC 10 card began last month as the company made an aggressive bid to take control of the growing post-sales market for PC graphics.

Working to ensure that it has a good share of both workstation and PC markets,

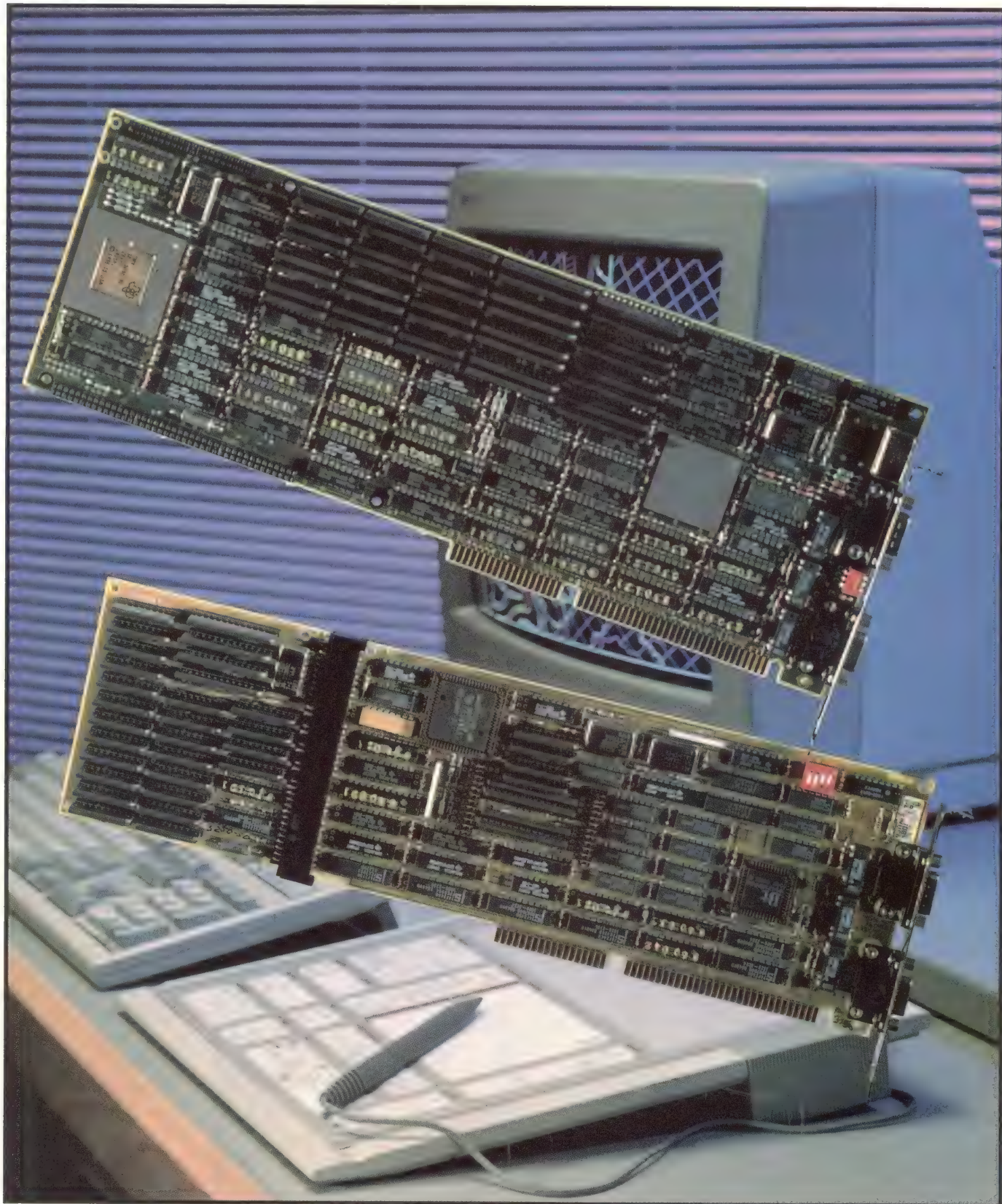
[BY BILL SHARP]

HP/Apollo already has introduced lower-priced workstation products (see *Low-End Workstations*, November 1989) bringing workstation capabilities within reach of more potential users.

At the same time, for users choosing to stay with PCs, HP has joined the small group of suppliers providing add-on cards to boost graphics performance of personal computers into the high-resolution range to aid applications including computer-aided design (CAD), desktop publishing (DTP) and computer-integrated manufacturing (CIM).

HP's new cards, the HP Intelligent Graphics Controller 10 & 20, are intended to set new price/performance marks and ensure a good share of the market for HP.

HP claims the IGC 10 is the first card in its class to sell for under \$1,000 (U.S. list is \$995). The card is based on a 50-MHz Texas Instruments TMS34010 graphics processor, and can display at resolutions of 640 x 480, 800 x 600, or 1024 x 768 in either 16 or 256 colors from a palette of 256,000. HP pegs the performance of the IGC 10 at up to five times that of conventional VGA cards. Ac-



The HP Intelligent Graphics Controller (IGC) 10 and 20 cards are for high-resolution personal computer graphics.

cording to HP, competing cards cost at least \$350 more, while offering less performance.

The HP IGC 20 is slated to be the first PC graphics card available using the 10-mips, 30-MHz Texas Instruments TMS34020 graphics processor. According to HP, it provides "instant screen response," and up to 15 times the performance of conventional VGA cards. The card offers resolutions of 1024 x 768 and 1280 x 1024, with 16 to 256 colors from a palette of 16.7 million. With a U.S. list price of \$2,495, HP claims the IGC 20 costs at least \$500 less than competitive graphics cards, while outperforming them. The IGC 20 becomes available Feb. 1, 1990. Additional memory for both cards is priced at \$400 for 0.5 MB VRAM and \$330 for 0.5 MB DRAM.

Standards-Based Designs

BOTH OF THE NEW HP IGC cards use an optimized version of the Texas Instruments Graphics Architecture (TIGA) 340 and Direct Graphics Interface Standard (DGIS) to ensure graphics compatibility with large numbers of existing and planned applications. Both employ 8- and 16-bit data transfer with noninterlaced screen refresh, and offer an analog VGA pass-through to ensure compatibility with existing VGA graphics cards for single-monitor applications.

HP's use of TIGA 340 is particularly interesting, because it's now supported not only by Texas Instruments and HP, but by Microsoft as well.

Design of the IGC 10 and 20 cards supports both Industry Standard Architecture (ISA) and Extended Industry Standard Architecture (EISA) PCs, including HP Vectra PCs. HP notes that the cards are compatible with PCs from most manufacturers, including AST, Compaq, HP, IBM, NEC and Zenith. The cards work with most monitors, including those from HP, Hitachi, Mitsubishi, Nanao, NEC, Nissei and Taxan.

Both HP IGC cards

allow on-board memory expansion up to 3.5 MB for large applications. A software utility simplifies installation by verifying configurations and setting up application drivers. IGC 10 can be upgraded to a maximum of 1.0 MB VRAM and 3.5 MB DRAM. IGC 20 can be upgraded to a maximum of 2.0 VRAM and 3.0 DRAM.

Applications Compatibility

THE IGC CARDS DEMONSTRATE HP's seriousness in promoting standards. By implementing both TIGA-340 and DGIS, the cards are compatible with more than 300 applications programs, says HP, including Anvil 5000, AutoCAD, AutoShade, Cadkey, CADVance, DataCAD, FastCAD, GEM, HP AXDS/PC, HP ME10d, Lotus 1-2-3, MicroCADAM, Microstation, MS Windows, P-CAD, Personal Designer, VersaCAD, Ventura Publisher and WordPerfect.

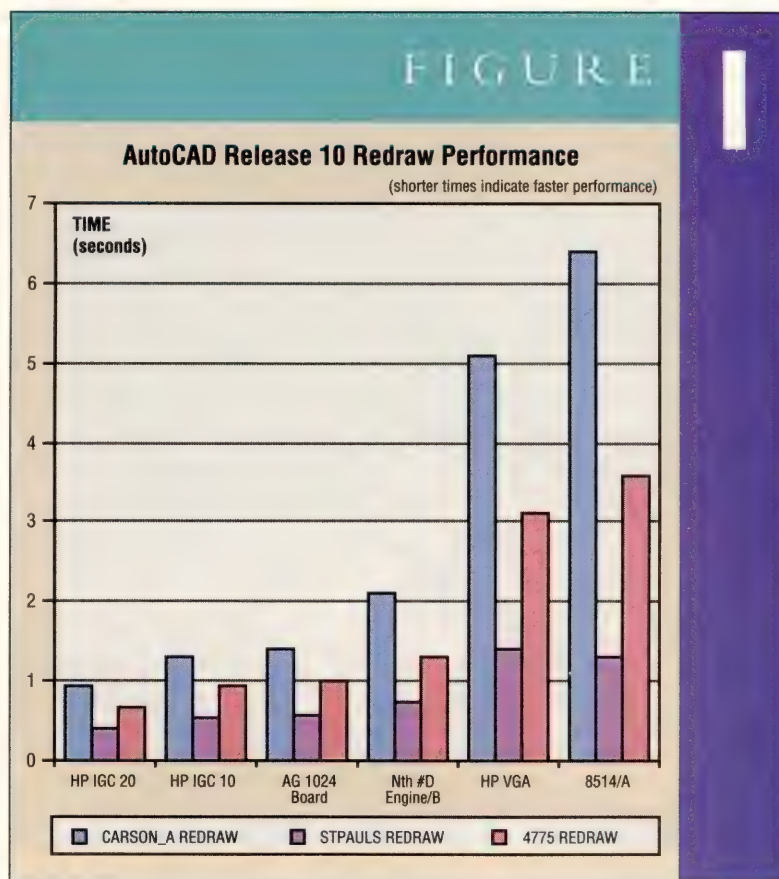
Compatibility with Microsoft Windows 286 and 386 brings with it the ability to run more than 150 windows applications. HP says there are a series of engineering applications and more than 40 CAD-specific applications known to be compatible with the new cards.

These two cards come to us from the same folks who designed

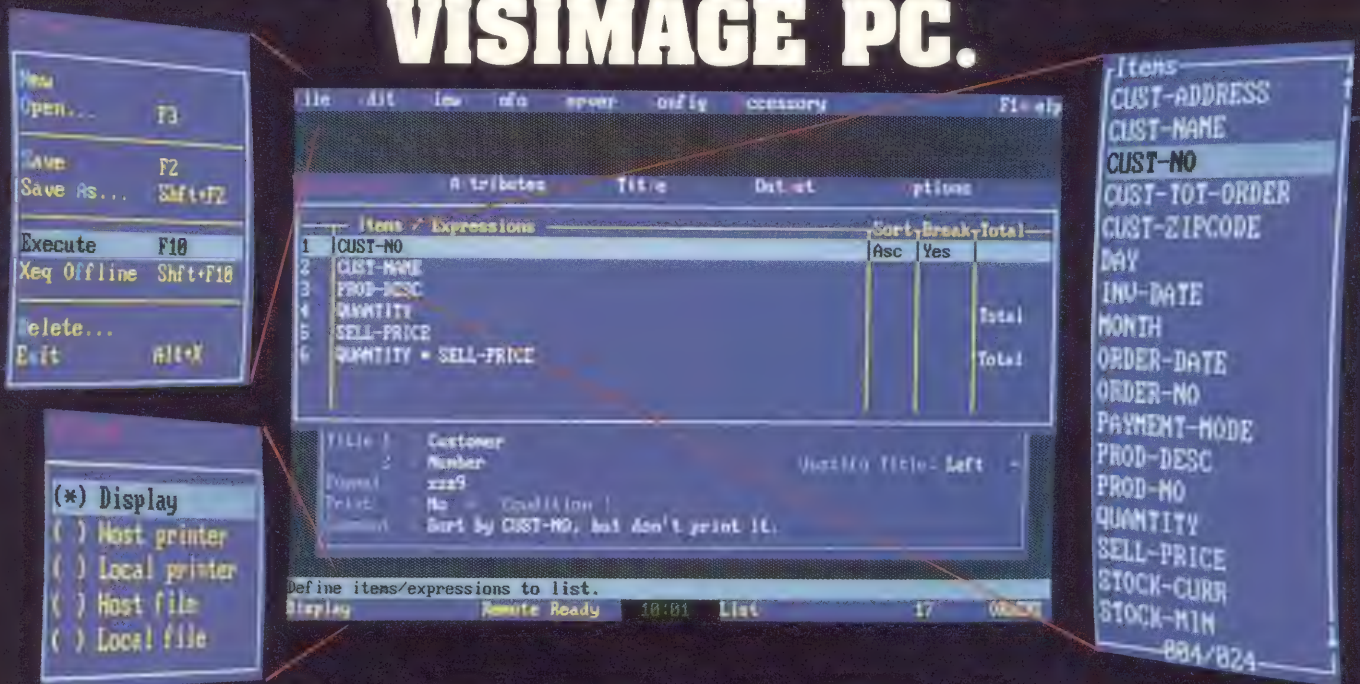
the graphics subsystems for HP's workstation products, and the performance shows it. HP's tests are based on benchmarks run with AutoCAD Release 10 for redraw, regeneration and zoom performance.

HP IGC 10 and 20 boards ran against Compaq's AG 1024 board (also based on TI's TMS34010 processor), Nth Graphics' Nth 3D Engine /B (a proprietary system), HP's own VGA graphics, and the IBM 8514/A (a proprietary system). Benchmarks used were 4775 (91kb), STPAULS (44kb) and CARSON_A (603kb).

Redraw competition showed the HP IGC 10 edging out the AG 1024 with slightly better performance in all three redraw benchmarks, surpassing Nth



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CIRCLE 186 ON READER CARD

engine by 40 percent or more on each benchmark, and beating HP's VGA and the 8514 by factors of three or more. The IGC 10 bowed only to the IGC 20, which performed 25 to 30 percent better.

Regeneration results placed all the contestants in a tight pack. Basically, both IGC products, the AG 1024 and HP VGA finished within four seconds or less of one another; Nth Engine followed two to six seconds later, depending on the test; and the 8514 finished one test up there with the front-runners, and trailed the pack in another, so take your pick.

Zoom performance showed the HP IGC 20 zooming in ahead of other cards by 22 to 25 percent. HP IGC and the AG 1024 were virtually identical, while Nth Engine lagged behind them by 20 to 30 percent. HP VGA and the 8514 trailed the HP IGC 10 and AG 1024 by a wide margin.

HP's test results clearly show the IGC 20 to be the leader in performance, while it also leads its class in price by about \$500. The HP IGC 10 ties the performance of the Compaq AG 1024, but sells for \$500 less than the Compaq product.

HP mentioned another competitor, Control Systems, which offers products also based on both the TMS34010 and TMS34020 processors. These products, the Artist T110 and T120, were not tested, and may provide some performance competition. HP's

These cards come from the same folks who designed the graphics subsystems for HP's workstation products, and the performance shows it.

data, however, showed the Artist T110 to be priced at \$2,695 compared to the competing HP IGC at \$995. At \$4,995, the Artist T120 competes with the HP IGC (\$2,495).

Both the new IGC cards (as well as the existing card) support display list capability. Tom Anderson of HP graphics marketing says the IGC 10 supports up to 3.5 MB DRAM. He says the DRAM is configurable, and depending on how it is used, could support from 1 to 6 MB of drawing data.

Display list with the HP cards does not support compres-

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sion, a technique used, for example, by Nth Engine to pack more data into existing disc storage. HP feels its own display list implementation uses much less disc space than other vendors, reducing the need to provide compression capability. "You trade off disc space for time when you use compression," notes Anderson. HP may, however, be considering compression for later release.

Rapid Market Growth

ALL THE FIRMS IN THIS particular market have their eyes on the same rewards. Dataquest (San Jose, CA), a market research firm, says sales of high-resolution PC graphics cards for CAD applications alone are growing at 35 percent annually. Other PC graphics application areas are growing quickly as well, including desktop publishing and imaging. Graphical User Interfaces (GUIs) for PCs, such as window-based software, is another area of growth that benefits greatly from improved graphics. With these areas experiencing growth, and 25 million industry standard architecture (ISA) personal computers out there, a math degree isn't necessary to determine the possibilities.

PC graphics continue to lag behind workstation graphics. The PC graphics market is badly fragmented, with some products using standards and others clinging to proprietary solutions. Functionality from one product to the next is inconsistent. Many of the vendors are small firms, and some of the products appear to be overpriced.

HP is deriving some advantages from its size — a factor that at times gets in the way of serving the customer's needs. Because HP works in comparatively large volumes with its major suppliers, it can negotiate good prices on parts such as the TI TMS processors. It also can negotiate contracts that give it priority deliveries for a time. This is why HP is promising the IGC 20 for February. Another advantage HP has over smaller suppliers

of graphics cards is its distribution channels. HP is working directly with dealers through its own network, rather than having to sell through distributors. This allows HP more control over the sales process and allows it to keep the price lower.

Dale Mehl, head of graphics business planning for HP's Technical Computer Group, targets no less a goal for HP than being a leading supplier of PC graphics products to CAD users. He points to HP's considerable success in workstation graphics products, and to the huge number of 286- and 386-based PCs being used in applications where a low-cost improvement for graphics capabilities would be welcome.

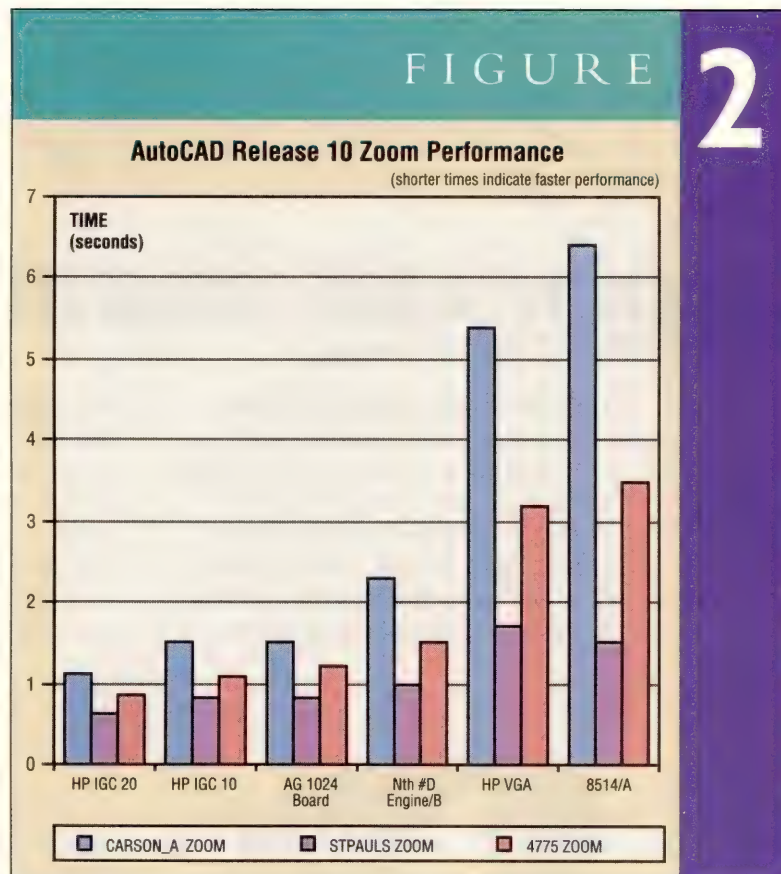
"We now have the capability to put the power of our workstation graphics SRX system onto a 486-based system, but the largest installed base out there is still using beefed up 286 PCs," says Mehl. "PC graphics has to focus on DOS and mainstream users to meet the needs of the marketplace."

Mehl estimates that more than 1 million PCs will be used for high-resolution graphics applications by 1991, and doesn't hesitate to point out that all of them could be candidates for one of HP's IGC cards. He projects the Dataquest growth estimate of 35 percent per year in CAD holding steady for three to four years.

"Our design is a simple one, and simple designs are easier and cheaper to implement," Mehl says.

According to Mehl, more than 600 CAD dealers are carrying HP products now, and will be working with the HP IGC cards as well. He also expects that the price/performance of the new cards will entice new dealers to begin working with HP.

Dataquest reports that PC-based CAD systems accounted for 73 percent of all CAD computer systems shipped in 1988. If this number holds for the near-term, along with 35 percent growth, then HP, with two strong tools to aid the CAD user, can look forward to some solid progress with these products.



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How Kelly unleashes HP performance.

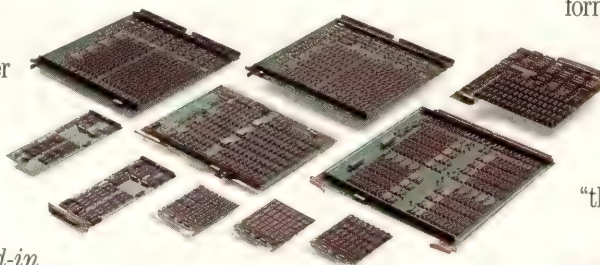
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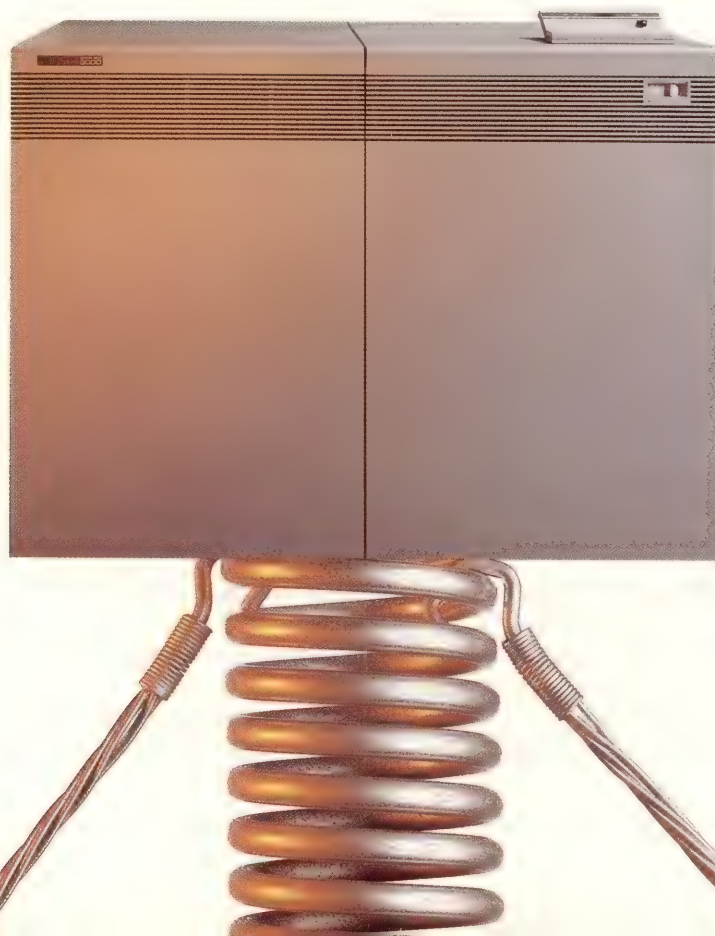
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How To Get The Most For Your Money

SHOPPING FOR USED EQUIPMENT

[B Y P E G G Y K I N G]



he business of buying and selling used computer equipment is often compared to the used car industry. Both used cars and used computers can be found through newspaper and magazine ads. Or, you can go to a dealer to buy a used machine.

If you buy through a classified advertisement, you'll most often get a good price, however, you run the risk of getting stuck with a lemon — with no warranty.

On the other hand, if you shop through a dealer, you'll save some time shopping, receive some sort of warranty, and most of the time receive a machine that has had some degree of restoration—but you'll pay more.

So, where should you buy used equipment?

That all depends on what you need and what condition you need it to be in.

Regardless of where you buy and why, there are three sets of terms that you need to define precisely even though the people on the selling end of the transaction may use the terms loosely: (1) dealer vs. broker, (2) repaired vs. refurbished, (3) maintainable vs. HP-maintainable.

Dealers And Brokers

GENERALLY, A USED EQUIPMENT dealership is a business that buys computers and peripherals, arranges for the machines to be shipped to its own premises, places them in inventory, and performs a certain amount of cleaning, painting and refurbishment.

On the other hand, if the business only buys the machines that a specific customer has requested, then the business is acting as a broker. In addition, computers and peripherals that are shipped directly from the seller's site to the buyer's have been brokered, even if they are

bought from a company that is nominally a dealership.

When you go to a dealer, you should expect top-quality service and systems that will be up and running as soon as you install them. You also should realize that your selection will be limited to the systems that the dealership has in stock. At some dealerships you get the best price by buying or leasing a complete configured system that includes drives, a printer and even CRTs.

Brokers have a place within the used equipment industry, too. Dealers have the overhead of maintaining a payroll, training technicians, paying for repair facilities, offices and warehouse space and using the necessary computers and instruments for diagnostic testing. These expenses are reflected in the markups for used equipment.

Brokers, on the other hand, can get by with a desk and a telephone. Therefore, you can expect to pay substantially less for equipment that comes to you straight from its former owners. However, with a broker, you won't have the benefits of refurbishment and guarantees for maintenance offered by a dealer.

Another way to buy HP 3000 systems is through the hardware placement network Linx (Rochester, NY). Linx adds no markup to the purchase price of the machine. Instead, sellers who find buyers from Linx listings are charged a nine percent transaction fee or a \$45 minimum fee.

Repaired Vs. Refurbished

RPAIRING COMPUTER equipment means fixing whatever doesn't work. Refurbishing equipment means making it function as if it were newly manufactured. In short, the repairer's motto is, "If it ain't broke, don't fix it." However, the refurbisher would say, "If it might break, go ahead and replace it." There is no industry standard definition of refurbishment in the used equipment business, so some of what passes for refurbishment is actually repair work.

The parts that are most likely to need replacement during the life of a computer system are the mechanical parts rather than the electronic components. From the standpoint of electronics, a used computer can be just as reliable as a new one — sometimes even more so — because the circuitry is already completely burned in. However, when it comes to the me-

chanical parts, a used machine is less reliable because moving parts wear down over time.

HP's Finance and Remarketing Division (FRD) uses the term *remanufacturing* to describe the comprehensive refurbishment process it performs on all equipment it sells. FRD routinely replaces about 70 percent of the mechanical parts in computers and peripherals. Of course HP has the advantage of knowing which mechanical parts to replace because it can rely on information collected by its field service organization to determine the parts likely to fail over time.

All equipment, whether it comes from rental or leasing returns, demonstration machines used internally or trade-ins, must pass incoming inspection to qualify for remanufacturing. After a piece of equipment has been thoroughly cleaned, has received updated ROM chips and the most current software revision level, it's run through several hours of mechanical, electrical and diagnostic testing. In the final assembly stage, the machine is reassembled with freshly painted panels.

Any machine that's sold comes with a Certificate of Quality signed by four people who worked on the machine: the assembly technician, test technician, electrical inspector and final inspector. This level of attention to detail comes at a hefty price. FRD's prices for remanufactured equipment are significantly higher than those of the independent dealers, some of whom also put machines through extensive rework and testing.

Some dealers clean the machines but do not refurbish them. Some mentioned that they do not go inside a machine that has an HP Certificate of Maintainability for fear of invalidating the certificate. The smaller the dealership, the less likely that the machines will be refurbished because to do so requires a trained staff, testing equipment and access to expensive service notes.

If you're doing business with dealers who do refurbishment and therefore include this service in the purchase price, your job as a buyer is to learn what the term *refurbished* means to the dealer. How did the equipment earn the distinction of being refurbished instead of simply pre-owned?

Minimally, you can expect that refurbished means repainted panels and replaced filters. A step further includes realigning the heads on peripheral drives, testing all mechanical components and replacing parts that don't work properly. Dealers who have their own systems in house for running electrical and diagnos-



The CE will check conditions in your computer room, propose a layout for the equipment you purchased and review installation procedures.

tic tests can offer more thorough refurbishment than those that do not. A dealer who replaces ROM chips and software to bring computers up to current specifications and engineering levels,

checks and replaces mechanical parts and runs performance tests is doing refurbishment that goes beyond simple repairs and touch-ups.

The purchase of a refurbished machine may also include some custom services. For example, if you buy from HP's FRD, you'll see a customer engineer (CE) on two separate occasions before the equipment is shipped. On the first visit the CE will check conditions in your computer room, propose a layout for the equipment you purchased and review installation procedures including details like how many amp breakers you'll need. On the second visit the CE will make sure that the site meets HP's criteria and is ready for installation.

Computer Solutions Inc. (Orange, NJ) has a test it calls the Simulation of Customer's Configuration (SCC). You tell CSI what operating system, revision, and applications you'll be running, and they load the system accordingly and test its operation for 24 hours. This type of testing may save future hassles and unexpected expenses if your computer room staff doesn't have the time to spend or the experience needed to assure a smooth installation.

If you intend to buy a refurbished machine from a dealer, you need to know what *refurbishment* means to the dealer. Be

On January 10th, we
had the first party.



sure that the level of refurbishment a dealer provides is in line with the price you are paying for a used machine. If you feel that refurbished means having the latest functional updates (revision level changes), you will need to buy from FRD or from an independent dealer who purchases Customer Engineering Organization service notes from HP. Dealers who have these notes are likely to charge higher prices because they'll need to account for the high prices that HP (along with all major U.S. vendors) charges for service notes.

Ask questions about the refurbishment process in order to learn if the system you plan to buy is truly refurbished instead of simply pre-owned.

Maintenance Options

DEALERS WHO SELL EXTENSIVELY refurbished HP 3000s almost always guarantee their eligibility for HP maintenance. Nevertheless, buyers need to be aware that there are two types of guarantees. Some dealers guarantee that the system will be maintained from the date that it's installed; others provide a 30-day guarantee that your system will

get a certificate from HP or you get your money back. When HP comes to your site to see if your system is eligible, the dealer who guarantees that you will be able to get maintenance is obligated to pay for any repairs or upgrades required in order for you to get an HP maintenance contract.

DO YOU REALLY NEED to have an HP-maintained system? If you're buying used equipment simply to have a spare for doing self-maintenance, you may as well get the lowest priced machine. You don't care how the machine performs; your only concern is that it has all the parts needed to keep your original system up and running.

Frequently, it's the brokers rather than dealers who handle transactions for equipment ineligible for HP maintenance. Nevertheless, some dealers who refurbish most of their equipment occasionally buy and resell systems that were de-installed without involving HP or systems with lapsed maintenance contracts at low "as is" prices.

Having a certificate of maintainability is important if your company plans to resell the system, but it's not the only way to guarantee that your system can be maintained. Several dealers including Advant, CompuTech, Computer Solutions and

digital™

DECstation 3100 workstation

It was a day for celebrating.

Because that was the day we broke with the news of our DECstation™ 3100 workstation, the first of Digital's family of UNIX®-based RISC workstations, systems and servers.

Shortly thereafter, we added to the family with the announcement of our DECsystem™ 3100 multi-user computer.

January 10th was also a day we broke something else—the \$1,000 per MIPS price/performance barrier. Something no one else had ever done.

The cheering you probably heard came from users whose applications always have them looking for more power at their desks. At last, a full 14 integer MIPS UNIX-based workstation was available at a price they could afford.

But the reasons for celebrating didn't stop there. While its unmatched price/performance put it in a class by

itself, the DECstation 3100 workstation fit perfectly into our integrated approach to computing. It includes the ability to share with VAX/VMS™ systems, Apple® Macintosh, MS-DOS® PCs and, of course, other UNIX systems.

No wonder January 10th was a day everyone celebrated.



Having a certificate of maintainability is important if your company plans to resell the system, otherwise you can expect very little resale value.

If your company employs former HP-trained technicians or other people who have a knack for keeping an old system running smoothly, you may be able to pay lower prices by bargaining on your own. These days, bankruptcy, mergers and leveraged buyouts mean there is good data-processing equipment waiting to be auctioned off by auctioneers such as Ross-Dove. There are also companies that avoid the middleman by advertising and selling their own surplus equipment. Unless you buy a system that comes with a certificate of maintainability, you can expect very little resale value. However, this diminished resale value need not be an issue if the price is right and your company plans to write off the equipment when it conks out.

Beware Of Hidden Expenses

IF YOU BUY YOUR USED system from an end user, a broker, or a less established dealership, you need to be especially careful about determining which party pays the incidental expenses involved in buying used equipment. In some cases, the unexpected expenses may drive up the bargain price

Ideal Computer Services offer third-party maintenance. Generally, these contracts are available only to customers whose businesses are within the dealership's service area.

On July 11th, we
had the second party.



of a system so much that you would have done better if you paid more up front and got the services of a dealer.

If you buy from HP, the high price you pay for a remanufactured system is not accompanied by a series of add-ons because HP follows the same policy it does for new equipment and includes all services and documentation in its price. If you buy from other dealers, make sure you know what is included before you sign the papers. When you buy a brokered system still running at another site, there may be even more hidden expenses than when you buy from a dealer's inventory. Figure out in advance who pays for what and get it in writing.

Closing Costs Contracts

WHEN IT COMES TO "closing costs," buying a used computer is more like buying a house than a used car. The contract can devote several pages to which party pays for what. Here is a list of items to consider when you negotiate a price:

1. Service charges for having the HP CE come out to de-install the systems. (Remember that the do-it-yourself approach

means no more maintenance from HP.)

2. Shipping costs.
3. Insurance to cover the system when it is de-installed and en route to your site.
4. Cables and amps.
5. Documentation. (Be sure you have a complete set of manuals for MPE unless you can get by with the sets you have for other systems at your site.)
6. Service charges for installation. (Does the dealership cover the expense of having HP install the system as part of its guarantee that the system will be eligible for HP maintenance?)
7. HP Software Support. If the former owner has let the Software Support Upgrade Product (SSUP) contract lapse, HP may

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DECstation 2100 workstation

Almost 6 months to the day, there was another reason to celebrate.

Because that was when we announced the DECstation™ 2100 workstation, the latest member of Digital's family of UNIX-based RISC workstations, systems and servers. In fact, on July 11th, the breadth of our offerings

extended from the DECstation 2100 all the way up to the DECsystem™ 5800 multi-user system—the industry's broadest range of compatible UNIX-based computers.

In the family tradition, the DECstation 2100 workstation broke new price/performance ground, too. It gave users the most powerful entry-level UNIX-based workstation available in the industry—10 integer MIPS for under \$8,000. The power of a RISC workstation for the price of a PC.

Besides sharing price/performance leadership, our two UNIX-based workstations shared a lot more. For example, the way they adhered to industry standards like the X Window System,™ OSF/Motif, TCP/IP, NFS,™ IEEE POSIX 1003.1, X/Open XPGII, among others.

The DECstation 3100 workstation on January 10th.

The DECstation 2100 workstation on July 11th.

Party. Party.



Dealers Who Stock Used HP 3000 Systems and Peripherals

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Amtek Computer Services
509 W. Terrace
San Dimas, CA 91773
CIRCLE 276 ON READER CARD

Computer Media
1420 Brook Dr.
Downers Grove, IL 60515
CIRCLE 298 ON READER CARD

CompuChange
13160 56th Court
Clearwater, FL 34620
CIRCLE 297 ON READER CARD

CompuTech
2721 152nd Ave. N.E.
Redmond, WA 98052
CIRCLE 296 ON READER CARD

Computer Remarketing
Company (CRC)
23950 Commerce Park
Beechwood, OH 44122
CIRCLE 295 ON READER CARD

Computer Solutions
397 Park Ave.
Orange, NJ 07050
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ConAm Corp.
1661 Nineteenth St.
Santa Monica, CA 90404
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CSU Industries
135 Rockaway Turnpike
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Houston, TX 77042
CIRCLE 286 ON READER CARD

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and Remarketing Division
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Mountain View, CA 94041
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Cleveland, OH 44147
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Now look at the third parties.

While all this celebrating was going on, it's clear that some people have been hard at work.

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It's a worthwhile expense to get an appraisal. Try to find a certificated appraisor to assess the equipment before you make an offer.

charge an additional thousand or two to update your system's HP software.

8. Operating System Software. If the operating system is not up to the current level, HP will charge time and materials for

the new version to be installed.

9. Third-Party Application Software. If you are buying a system that comes with some applications loaded, make sure that the licenses are still valid or you will have to purchase the software again. HP CE's will not install third-party software unless you have the required licenses.

To make sure your "good deal" on used equipment doesn't end up costing as much or more than the system with the higher price, it's a worthwhile expense to get an appraisal. The American Society of Appraisers recently began a certificate program for high technology appraisors. Try to find a certificated appraisor to assess the equipment before you make an offer.

ONCE AGAIN, THE USED CAR analogy comes to mind. Getting an appraisal before buying a system is like having a mechanic pass judgement on that car you think you want. Are you getting a lemon or have you found the machine that will keep running smoothly for year to come?

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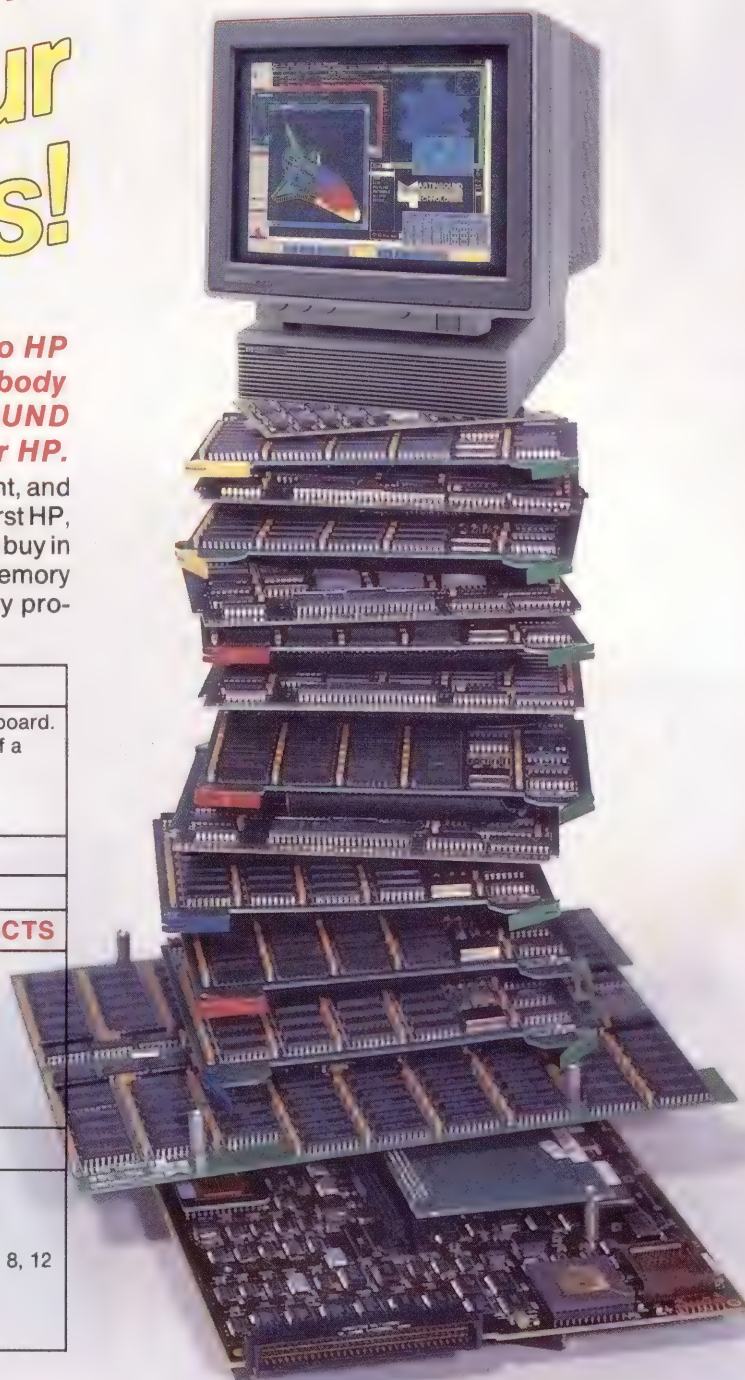
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WHEN DISASTER STRIKES

How Well You Plan For A Disaster Could Determine The Survival Of Your Company

Coping with the effect of disasters on a company's data processing operations has long been a concern of mainframe users. Managers of these systems traditionally regard DP (data processing) operations, data and the associated hardware and software as assets that must be protected. Mainframe managers who have critical applications requirements and who have weathered a disaster know how important an in-place contingency recovery plan is. They've witnessed first-hand the confusion, panic, damage to business and general upheaval that follows a disaster.

Today, an increasing number of critical applications run on minicomputers. As a company's dependence on the minicomputer system grows, so does its reliance that the system always will be available. Not only are minis commonly used to run everyday business functions, but many are engaged in vital income-generating activities. The people responsible for these systems must follow the lead of their mainframe counterparts and provide contingency plans to protect their company's vital DP operations.

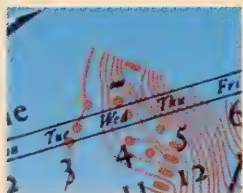
The type of disaster recovery program and technology required by minicomputer users is directly related to the kind and amount of exposure the company could suffer if a DP disaster occurred.

Ask yourself, how long can I be without my DP services before extensive damage is done to my company? The answer determines if a disaster recovery plan is needed and, if so, what type it should be. That is, how critical is it to keep your DP operations up and running without interruption?

Defining Disaster

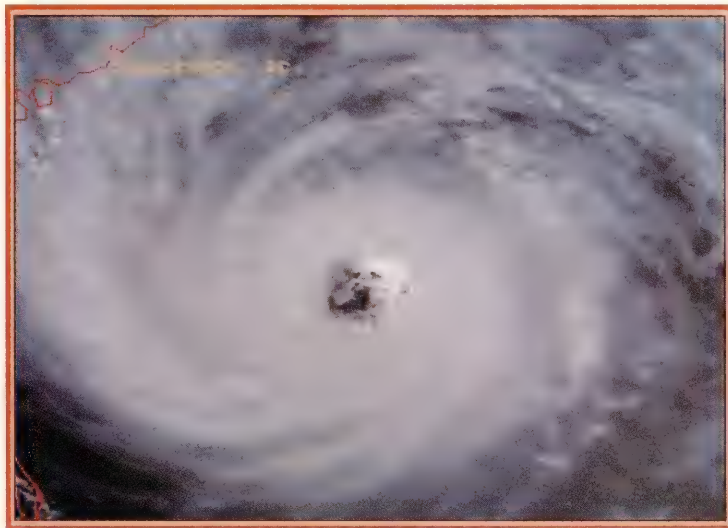
Disasters needn't be spectacular, headline-grabbing calamities such as the Oct. 17 earthquake that rocked San Francisco, or hurricane Hugo that struck the southeastern coast of the United States in late September.

Most DP disasters aren't so dramatic. The most common DP disasters result from combi-



DISASTER RECOVERY

Ron Levine



Hurricane Hugo slams into the South Carolina coast.

nations of accidents and negligence, such as a careless coffee spill on a vital diskette, which leads to the discovery that backup copies of data were never made. Other DP disasters occur without damage to the equipment or data files.

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Instead, something happens that precludes access to the data center.

For example, a law firm based in New York was prevented from using its DP center when a building inspector ordered the air conditioning system shut down for several days while wiring was changed to conform with local codes. The law firm declared a disaster under the terms of its contract. It moved key personnel and data files/software to a hot site, where it operated for 2 1/2 days. Because the company had a one-day warning of the impending shutdown, its DP services weren't interrupted, and business continued to operate smoothly.

Another customer, a financial services company based in San Francisco, was locked out of its DP center indefinitely by the EPA when asbestos was discovered in the building. The facility was sealed and access denied for several months. The company found an alternative site, activated its disaster recovery agreement and lost only two business days before full DP operations were restored.

In Chicago, a company was denied access to its computer center because of a bomb threat. The building was evacuated and alternative processing facilities had to be found.

In these examples, there was no damage to the computer systems — the hardware, software and data files were intact. However, access to the centers was impeded by external events that resulted in their loss of use.

What's a disaster? For most companies, a DP disaster occurs any time DP services are unavailable. This could be caused by a system fault (hardware or software failure, unusable data files), loss of the center's facilities (because of fire, flood, and so on) or lack of access to the processing system (caused either by physical barriers to the facility or a simple telecommunications failure). Any condition that interrupts normal DP operations is a disaster from which you must recover.

What's At Stake

Some institutions and businesses, such as those in the financial sector, are required

by law to have disaster recovery plans in place and to have them tested periodically. They implement disaster recovery plans to comply with the law.

Others find it harder to justify such a

plan. The reason for this resistance is twofold.

1. **Cost** — Disaster recovery is a bottom-line expense that does nothing to increase income or productivity. It's easy

[THE UPS OF POWER PROTECTION]

Probably more than half of all service calls are related to power problems. Power problems wreak havoc during data processing operations by producing intermittent system errors, keyboard lockups, interference with communications, and simply by causing strange behavior in your computer system.

Power disturbances are also a leading cause of DP disasters. When these power interruptions are long or prevalent, they're no longer annoyances. They're operational disasters.

The possibility of a power-related disaster is greatly reduced by incorporating an uninterruptible power supply (UPS) into your configuration. A UPS isolates the load (your computer system) from the source power (the utility company) and acts as a middleman in supplying clean, reliable and continuous input power. Computers operate over a very narrow input voltage range. Thus, fluctuations in this range for only a few milliseconds can cause major problems or damage to the system. Power line protection is vital to the health of your system.

Although various types of UPSs are available, only true online devices with sine wave output can fully protect the system. Online UPSs supply power to the load 100 percent of the time. They continuously convert utility input power to DC and back to AC to power the system. They act as generators, always providing power, and don't have to be switched on and off, thus saving precious milliseconds during power failures. And that power is always fully conditioned and regulated.

When purchasing a UPS, your main concerns should be:

1. How well the unit emulates ideal utility line power.
2. Is the unit's output a pure sinusoidal waveform? The output amplitude and frequency must match the user specifications precisely.

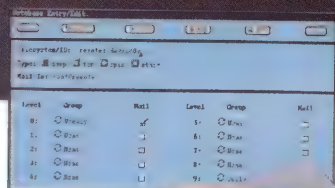
Other features to look for:

1. Audible and visual alarms for notification of power problems.
2. Adjustment-free operation (no maintenance required).
3. Long-life maintenance-free battery with reserve time under a full load.
4. A UPS that's microcomputer-based.
5. Monitoring of the computer system to ensure that it doesn't crash during a power failure. That is, the UPS provides full power for a predetermined time, based on battery charge, and then initiates an orderly shutdown of the system when the battery charge degrades to a threshold level.

You can calculate the rating of the UPS device needed by listing all equipment to be protected by the UPS, listing the wattage rating for each device and calculating the total watts required. You then can select a UPS with a wattage rating equal to or greater than the total requirement.

Some UPS devices work in conjunction with probes for environmental monitoring of the computer center. These units provide power conditioning and distribution and sensing of site hazards such as fire, water and humidity. An orderly system shutdown is activated whenever a previously set threshold is exceeded.

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to say, "What are my chances of having a disaster this year? We'll implement it next year." True, chances of a flood or an earthquake may be slim. But what are

periodic testing and updating of the recovery plan) makes it less than appealing to an already overworked DP manager and staff.

... what about the possibility of being personally liable for information processing damages? Federal law holds executives liable for not protecting their data and computer systems in financial fields.

the chances of a disc crash, a backup failure or an upgrade that wreaks havoc with your system? Unfortunately, these disasters aren't so unusual.

2. **Workload** — Resistance to a disaster recovery plan sometimes comes from the DP department, which should know its value. The extra workload associated with a viable plan (e.g., providing for current backups, storing them off-site,

On the other side of the cost and workload issues is the question, Can I afford *not* to have a recovery plan in place? This can be answered with other questions: What's the exposure of the company? How much will downtime cost? Can the company survive an extended DP interruption?

According to statistics quoted by National Computer Systems, "The average

maximum downtime for all types of industry before major loss of business occurs is 4.8 days." If your company's financial exposure and survival doesn't warrant a disaster recovery plan, what about the possibility of being personally liable for information processing damages? Federal law holds executives liable for not protecting their data and computer systems in financial fields. And law suits have been brought in other industries by disgruntled stockholders and creditors against executives responsible for a company's well-being under the Prudent Man Rule. Executives have been charged with negligence and not exercising ordinary and prudent precautions in safeguarding valuable assets, e.g., DP operations.

Technology And Strategy

A range of plans is available from a variety of sources to protect Hewlett-Packard users from unexpected DP interruptions. The type of plan needed is directly

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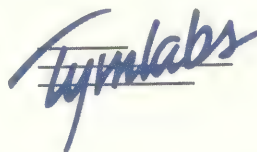
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related to how long the company can cope without its automation processes. If they are critical to the company, some level of disaster recovery is needed. If, however, the company can replace its DP services with a manual system until the computers are back online, then a disaster recovery plan probably isn't required for the DP department.

A strategy for formulating a recovery plan follows:

- Address the entire business environment and not just the DP center. Com-

puter operations in most companies are weaved into the business's mainstream and aren't a separate entity.

- Ensure that a corporatewide commitment is made to the recovery plan. Resources such as personnel and funding, as well as top management involvement, are vital to a recovery plan.

- Identify individual personnel and define their responsibilities and authority during a disaster recovery operation. Alternative lines of communication and an emergency chain of command (with

built-in contingencies) should be spelled out on a companywide basis.

- Define which operations are critical and must be protected immediately. Prioritize the remaining operations in terms of which can be lost for a short time and which can be lost for an extended time.

- After the plan is in place, update and test it on a regular basis. Your business isn't static, and the disaster recovery plan it depends on shouldn't be, either.

The main types of disaster recovery programs available include hot sites, cold

[DISASTERS — HOW TO PREPARE FOR THE NEXT ONE]

No one at Aldon Computer Group in Oakland, CA could have imagined the devastation that occurred Oct. 17 when an earthquake rocked their 85-year-old brick building, causing the 11-story marble staircase to collapse, topple file cabinets and send PCs sailing through the air.

However, Aldon's technical director had enough time before the power went off to perform a controlled power down on the company's HP 3000 Series 37. Although dented from a file rack that toppled onto it, the Series 37 kept running after the 7.1 earthquake struck.

Later, 10 Aldon employees waited for a fire department aerial ladder truck to remove them from their fifth floor office. The building has been "red tagged" by the city, meaning it is unsafe to use. The systems software development and marketing company may never be able to return to their office.

Although there always will be unforeseen consequences when any sudden disaster strikes, the goal of disaster preparedness is to learn as much as possible the easy way, in advance, instead of the hard way, after the fact.

Aldon Computer Group reopened in temporary quarters just two days after 10 of its economic loss employees escaped their fifth floor office by ladder. Aldon was spared major upheaval because it adhered religiously to the good business practice of backing up tapes and storing them offsite in a safety deposit box.

Aldon's experience in disaster preparedness is a good example of ways to minimize loss when disaster strikes.

Among the things that Aldon learned the easy way:

- Always back up all work on computers, both small and large, at the end of every working day. Aldon didn't lose documents, sales agreements, contracts, accounting records or coding because the Series 37 and their PCs had been completely backed up the night before.

- Store tapes offsite. Aldon had a backup tape stored in an offsite safety deposit box. Having intact tapes at a condemned site would have been no help. The firefighters allowed employees to take only those things that they could carry while keeping both hands on the ladder.

- Automated records are easier to retrieve than paper files. Just this

year Aldon had automated its prospect tracking system, so this information was stored offsite. If they had still had a paper filing system for these records, there would have been no way to retrieve them from toppled file cabinets and carry them down a ladder.

- Make copies of printed reports at regular intervals. An Aldon employee was able to bring customer lists with him, and the list was current enough to use for calling customers from the company's temporary quarters.

Federal Mogul's Component Group in South Carolina learned the same lesson the hard way. If someone had printed out a copy of its inventory report in preparation for Hurricane Hugo, there would have been no rush to reassemble its Series 70 weeks before the facility could reopen. Without recent printouts, they had to rely on the inventory records stored precariously in its storm-damaged system. Aldon also learned a couple of lessons the hard way:

- Store the key to offsite backup storage away from your place of business. Aldon's key was locked in a file cabinet and employees had to spend some precious time looking for the key. That time could have been used to gather company records.

- Make a checklist of things to take if you need to evacuate a building. Aldon employees had to make quick decisions about which papers they should take down the ladder with them. A checklist would have helped them to choose the most important items. It should be noted, however, that in a time of disaster, employees are only responsible for getting themselves to safety.

Computing equipment is replaceable, and it's also something that can be borrowed. Telamon, another Oakland-based company in the HP community, is letting Aldon have space on its HP 3000 until the company can get its own undamaged system out of the building. But when customized software and records are lost or inaccessible, the business suffers.

Businesses run on information; therefore, any good contingency plan needs to include steps to protect vital company records. With all of its records intact, Aldon can do business in temporary space and on borrowed machines for as long as it takes.

Would your company be as well off in a similar circumstance?

—Peggy King



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sites, equipment replacement, data recovery and data protection.

Hot sites are designed for those who can't afford to be without their DP operations at any time. These complete data centers are equipped with the systems and communications lines needed to take over immediately as the client's processing site. This data center, along with the customer's data, programs and staff, becomes a mirror image of the client's regular DP site when a disaster is declared.

Cold sites, sometimes called shells, are ready-to-use computer centers without the computer systems in place. They

The main types of disaster recovery programs available include hot sites, cold sites, equipment replacement, data recovery and data protection.

have power, communications lines and an operational environment ready on a standby basis for a client that needs to move its computer systems and staff to an alternative site. This setup is for those

who can afford a few days of downtime during a DP interruption.

Equipment replacement agreements are similar to homeowner's insurance policies. They protect the client against

[HP CUSTOMER ENGINEERS RESPOND TO HUGO AND QUAKE VICTIMS]

Through hurricane and earthquake, Hewlett-Packard customer engineers (CEs) from HP's Worldwide Customer Support Organization stood ready to help customers resume their business operations in the wake of regional disasters. Before Hugo battered the Southern coastal region in September, businesses in the Charleston area knew there was a major storm coming and were able to prepare before they left the area.

The account CE handling Federal Mogul's Components Group in Summerton, SC called the system manager to advise the data processing department to construct a tent for the Series 70 and its peripherals. By following this advice, Federal Mogul was able to minimize the water damage to the system when the force of Hugo's winds and rain broke through the roof at its production facility. After the Thursday night storm, HP was back on Tuesday morning to do a damage assessment and get the system up and running days before the rest of the production facility could reopen. Production managers needed the system to generate inventory reports before the plant resumed operations in order to record sustained losses.

For customers who had Micro 3000s and other small systems, HP's advice was to move the equipment inland. CEs called these customers and coached them through the process of disconnecting and packing up their systems.

Charlotte, NC didn't expect Hugo to travel north and hit the city with an intensity usually felt only in coastal regions. HP's offices in Charlotte sustained \$200,000 worth of damage when the storm tore through the roof. Power and phone service went out forcing administrative employees to go to Greensboro to work during the week while the building remained closed.

Even while Charlotte and Charleston were virtually shut down, CEs continued to work with customers in the area. District Manager George Stiefel left his office in Columbia, SC to spend the week with CEs helping customers in Charleston and nearby coastal communities. Because the phones were out for a week after the storm, CEs went from site to site to help where they were needed. HP was able to service larger customers, like the State Farm office, get their systems

back up with rented generators. Because power was restored bit by bit through the region, HP was able to have a CE on site when most of its smaller customers were ready to restart their systems.

Damage Assessment

Damage assessment was another important function CEs performed in Hugo's aftermath. However, there were obstacles and uncertainties associated with the task.

At Godwin Associates, an architectural firm in Charlotte, the CE who had come to assess damages was unable to enter the computer room because a large tree had fallen through the roof and blocked access. Even when access was no problem, it was often difficult to judge whether equipment should be replaced. Pieces of equipment damaged by rain water were more likely to be salvageable than those damaged by salt water, but any water damage affects the reliability of equipment. In general, computers sustained less immediate water damage than disc drives and printers because mechanical parts are more susceptible to rust and erosion. Nevertheless, CEs cautioned customers to be aware that mineral deposits on boards could shorten the useable life of electronic equipment.

The Atlanta Response Center, which handled many storm-related calls in September, had to fill in for the Mountain View Response Center when the 7.1 earthquake shut down the Bay Area on Tuesday, Oct. 17. The response centers activated a disaster plan that allowed them to re-route phone traffic at a moment's notice. News of the earthquake reached the East Coast after 8 p.m., at a time when only a small group of employees were on duty. Many Atlanta response center employees who were set to watch the World Series that evening, knew they needed to report to work and came without having to be called. The Atlanta center handled all North American calls until the Mountain View center resumed operation on Thursday (Oct. 19).

HP's Customer Engineers (CEs) took a proactive role in providing free emergency service to Bay Area customers. Shortly after the

(Continued on page 58.)



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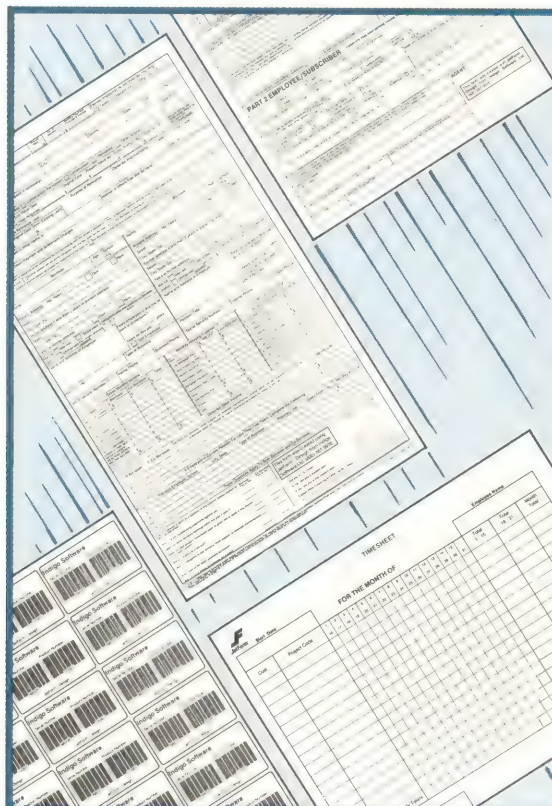
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loss of computer equipment and facilities. Damaged components (including specified software) are repaired or replaced, and expenses for such things as temporary locations and transportation are reimbursed.

Data recovery services aid the user in recovering lost data, rebuilding discs and removing contaminants from media.

Data protection agreements provide for safe storage and backup of operational

software and data files off-site.

Mobile disaster recovery centers, the newest innovation, are offered by Granada Computer Services in the U.K. and Provident Recovery Systems in the U.S. Granada's Disaster Recovery Division provides mobile backup support for high-end minis from 10 manufacturers. It receives about two disaster-related calls per month, according to Alan Penny, a company spokesperson.

Provident Recovery Systems was the first to introduce the mobile shell environment concept in the U.S., says Deborah Godfrey, executive vice president. At the time of disaster, Provident facilities are delivered to a predetermined site at or near your existing data center.

The transport trailers are installed, wired and operational as soon as the customer's system is added (the trailers can accept any type of computer system).

[HP CUSTOMER ENGINEERS RESPOND TO HUGO AND QUAKE VICTIMS... CONT'D.]

quake, members of HP's Worldwide Customer Support Organization (WCSO) held a meeting to draw up a list of the parts — such as power supplies, disc drive heads, and certain boards — thought to be the most vulnerable to damage from vibration. To assure an adequate supply of these parts, WCSO ordered a special allocation to be flown in to their Bay Area stockrooms from the divisions where they were manufactured. The emergency program for earthquake-related problems also was made available to customers without support contracts.

The earthquake caused far more damage to structures than it did to computer equipment. HP was on hand to assist companies that needed help resuming normal business operations even if no equipment was damaged.

Photo and Sound, a San Francisco-based personal computer and video dealership, suffered no damage to the Series 70 it used for sales order entries. That system was scheduled to be replaced by a Series 950 as soon as the new order entry software system written in a fourth generation language was up and running.

The company was in the middle of what was to have been a gradual move to its new warehouse and data processing center in Stockton, a city in the seismically stable San Joaquin Valley about 90 miles east of San Francisco. The Series 950 that runs the warehouse was delivered to Stockton earlier this year, and the company had planned to upgrade to a Series 960 and move the Series 925 it uses for software development to the Stockton site by mid-1990. In the meantime, the Series 70 at the San Francisco warehouse continued to handle the sales order entries.

During the earthquake, an adjacent five-story building threatened to fall on the warehouse that Photo and Sound had occupied for 40 years. When the fire marshal declared its historic building uninhabitable, the company accelerated its move to the Stockton facility. That same Friday, HP sent out a team of CEs to help dismantle the Series 70 and the Series 925 and to move them to Stockton. There also were several locally-based CEs on hand to help with installation when the systems arrived. By noon on Saturday, both systems were up and running.

The computer room in Stockton had been designed to accommodate Precision Architecture systems, but it lacked an air-conditioning system needed for the Series 70. HP helped Photo and Sound configure the Series 70 and devise a way to keep it cool until the air-conditioning could be installed. A window in the computer

room had to be removed in order to install a fan for cooling the system. The relocated systems were operational weeks before the leased lines were ready for use.

Photo and Sound data processing employees reported to Stockton until the leased lines were working, and the rest of the distribution center employees moved to another Photo and Sound building in San Francisco. President Douglas A. Michael was pleased that HP's timely response made it possible to re-establish operations quickly.

CEs with customers in affected areas didn't wait for customers to call them — they called the businesses to see if everything was okay. For example, two CEs who were stranded in Santa Cruz after the quake because of landslides on Highway 17 used their time to visit other customers in the area. In cases where the customer could not be reached on the phone, the CEs would drop by the site. If they found no employees there, they would leave a business card and detailed instructions about how to restart after a power outage. In other cases, the CE would attempt to locate its customer's management and data center staff.

CE Chuck Wical couldn't get through when he called the offices of VIBA Insurance Administration Inc. in Los Gatos, a community near the quake's epicenter. Then he called the company's vice-president in Los Angeles to find out how to get in touch with the system manager and other employers. When employees returned to work, they found that the disc drive in their Series 42 had burned out a board because of frequent and abrupt fluctuations in power after the quake. When Wical telephoned, he was able to find out what part the drive needed by having an employee read the front panel display. After he checked and found out that his office didn't have the part, Wical located one from the nearby Mountain View office, picked it up, and got the drive running that same day.

In addition to technical assistance, HP also was quick to respond with humanitarian aid during the two major disasters this fall. HP's Southern Sales Region organized a drive to raise money and donate food to victims of Hurricane Hugo. Two days after the Bay Area earthquake, Hewlett-Packard announced a \$100,000 donation to the American Red Cross for use in recovery activities. Employees also participated in Outreach programs to bring the people and businesses together who needed services with those who could provide them.

—Peggy King

The mobile units are self-contained and include air conditioning, fire protection, power panels, communications capabilities, humidity control and, if needed, diesel-generated power. The mobile center is custom designed, with raised computer flooring that can be joined to provide from 600 to 3,500 square feet of operational space.

Aside from disaster recovery vendors, consultants can help you formulate a companywide plan and aid in its implementation.

Also, do-it-yourself plans can guide you through creating and installing a workable disaster contingency plan if you choose to go it alone.

No matter which path you select, it's imperative that a working, consistently

updated and tested disaster recovery plan be implemented in all minicomputer critical applications areas. If your mini is taking on the responsibility of a mainframe, it must be defended as a mainframe would be. If it goes down, the

time it takes to return the computer system to operational status could decide the survival of your company.

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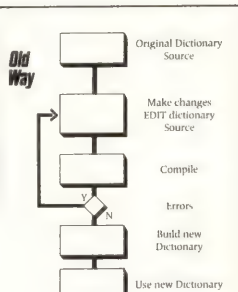


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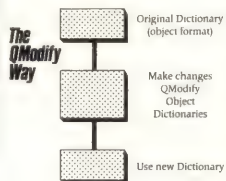
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BUILDING A BETTER MOUSETRAP

HP's Design Center Integrates Design And Test Environments

Information management is a key ingredient to increased productivity in the designer's world, much as it is in the business world. Information created by engineers in one phase of the development process can be used in other stages of development to reduce redundancy and the time to market complex electronic products.

The Hewlett-Packard DesignCenter in *Figure 1* shows several design and test products used in the development of electronic systems. Also shown are links between these products reflecting the integration HP has incorporated into DesignCenter. The links range from design to design equipment of different disciplines (ME, CAD, EEC), design to prototype test equipment and design to manufacturing test equipment.

The level of integration shown in *Figure 1* is unique to the electronics industry. By understanding the capabilities and limitations of the links, an organization can reap the many benefits of an integrated design and test environment.

Hardware And Software Development

Traditionally, the stage of system development during which software and hardware are merged is prototype debug. Merging software and hardware this late in the development process leads to costly corrections to both types of designs.

Using link 1, software and hardware are merged during the design phase before any fabrication takes place. As hardware development takes place on the Electronic Design System (EDS), and software development progresses on the HP 64000UX, the results of these designs can be merged to simulate a "soft breadboard" on EDS. EDS has the ability to simulate all of the

elements of which a circuit is comprised. The contents of the memory devices in a circuit, however, aren't included in the simulation in a non-integrated design environment. Using link 1, the assembled program may be sent from the 64000UX directly into the memory components on EDS. The circuit being simulated may now include the actual contents of the memory devices developed on the 64000UX.

As the circuit is simulated, design errors will be uncovered — some software and some hardware — that may be easily and quickly corrected during the design phase. Many of the errors that wouldn't have been uncovered until the prototype phase if link 1 weren't employed now are found much earlier in the design process. Using the rule of thumb that the cost of correcting design errors increases by 10 times per phase, a correction made during the design phase costs one-tenth as much to fix as the same error that is corrected during the prototype debug phase.

Because both EDS and the 64000UX run on the same HP-UX family of workstations, transferring the compiled program from the 64000UX to EDS is simple. The process of creating a program, loading the program into the memory devices on the "soft breadboard," and simulating the circuit, is an iterative process. The ease with which the transfer of data takes place plays an important role in making this link effective.

Schematic Capture And Printed Circuitboard Design

Design and simulation of the circuit on EDS to insure it will operate as expected is vital to reducing development time. After the circuit is designed, the next phase is designing a physical printed circuitboard. Using link 2 in a description of the circuit developed on EDS may be sent directly to the HP Printed Circuitboard



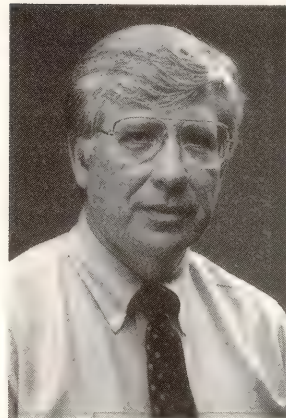
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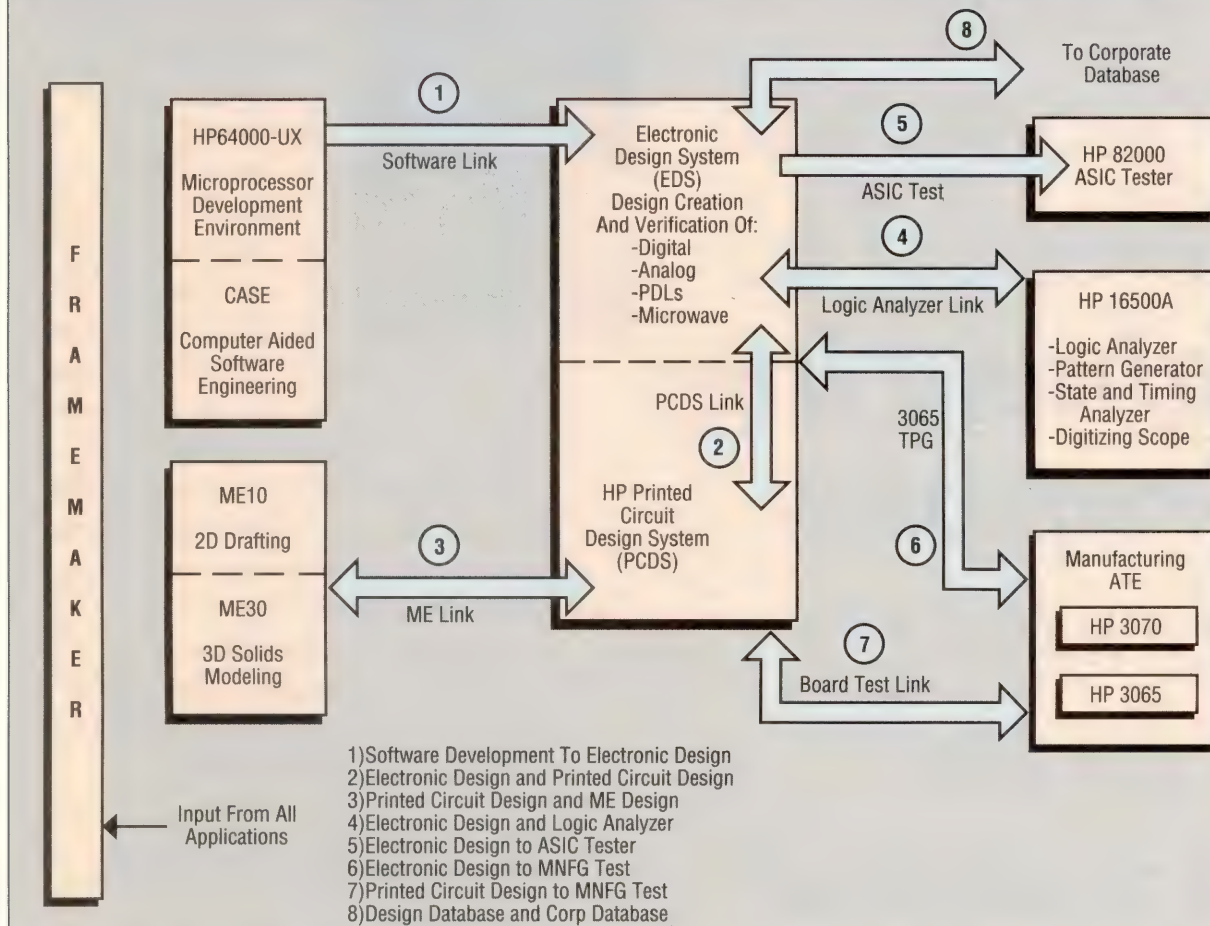
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FIGURE



HP's DesignCenter.

Design System (PCDS).

This link eliminates the need for any manual effort to migrate the design from the schematic capture and simulation tool, EDS, to the physical layout tool, PCDS. Traditionally, this has been an error-prone process when performed.

Having 100 percent accurate design data from EDS is essential to designing a correctly printed circuitboard. After the printed circuitboard design is completed on PCDS, any PCDS initiated changes automatically can be incorporated into the schematic on EDS. This results in a closed loop between EDS and PCDS in-

sureing that no design errors are introduced when design data is exchanged.

Mechanical And Electrical Design

Mechanical and electrical design have long been considered "separate" design disciplines that should merge late in the design process when prototypes are assembled. This, of course, has resulted in many a prototype printed circuitboard that simply didn't fit into the cardcage the mechanical engineer designed.

Exchanging data between PCDS and the 2-D and 3-D mechanical systems has proven to eliminate many design errors that would be uncovered only after the

electronic system has been fabricated. Link 3 shows the exchange of data between PCDS and the mechanical engineering tools.

By transferring a completed printed circuitboard drawing from PCDS to the 3-D solids modeling tool, ME30, a 3-D model of the printed circuitboard can be viewed and merged with the cardcage to insure the board fits into the cardcage. The built-in "clash" function of ME30 may be used to insure that parts of the printed circuitboards don't interfere with other mechanical parts of the system.

Figure 2 shows a printed circuitboard designed using PCDS and transferred to



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ME30 to show the 3-D version of the board.

This link also solves a long-standing problem in the world of electrical design:

Mechanical and electrical design should merge late in the design process...

creating assembly drawings. After a printed circuitboard has been completed, an assembly drawing is developed that documents the board with dimensions, comments, instructions for assembly and so on. Using link 3, the board design can be transferred from PCDS to the 2-D drafting system—(ME10), where the drafting capability of ME10 may be used

to create the assembly drawing. This always has been a time consuming process when performed manually, especially in light of the fact that so many design changes must be incorporated into assembly drawings.

Simulation To Prototype Test

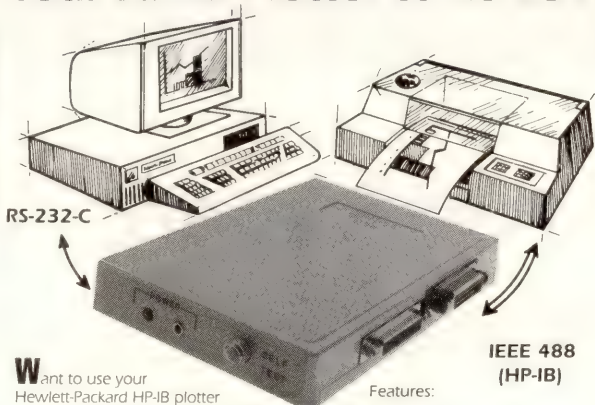
All of the links discussed have been confined to the design world. All of these design links are useful in developing a more reliable system that will have fewer design errors. Yet, at some point the development team will move from the design world to the real world when prototypes have been fabricated. It's at this point, prototype debug, that the designer would like to reuse much of the design data to help get the prototype circuit working. Link 4 addresses this need, that is, bridging design verification to prototype debug.

EDS has been used to simulate a "soft

breadboard" that is, simulate the operation of a circuit to insure it operates as intended. During this simulation process, the designer has developed a set of stimulus for the "soft breadboard" that he now would like to use to stimulate the prototype. Link 4 facilitates the transfer of stimulus from EDS to HP's 16500A logic analyzer. This stimulus now is applied to the actual prototype using the built-in pattern generator of the 16500A. The stimulus that was painstakingly developed on EDS now has served two purposes—to both verify the the operation of the "soft breadboard" on EDS as well as the proper operation of the prototype in the lab.

After the board has been stimulated with the pattern generator of the 16500A, the logic analyzer then captures the response of the prototype. In addition to viewing this response on the 16500A, the user also can transfer this response to EDS,

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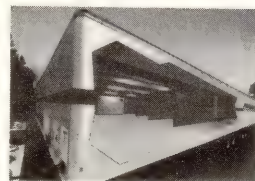
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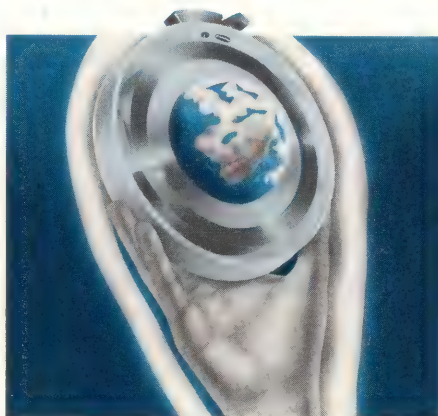
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again using link 4, and compare the expected response of the circuit (the "soft breadboard" simulation results) to the actual response of the prototype (the data captured on the 16500A). Figure 3 shows a comparison of the actual vs. expected response of a circuit. Signals "A1" and

The time-to-market of electronic products is often the determining factor...

"B1" are the inputs to the circuit and "SUM1" and "CARRYOUT1" are the outputs. The crosshatched areas on the output signals indicate the areas where the expected and actual results differed. The designer would be alerted to these discrepancies and assess their impact on the circuit.

Simulation To ASIC Test

The use of application specific integrated circuits (ASICs) has increased dramatically over the last few years. ASICs are semi-custom ICs that are designed in a way

very similar to board level development, except that an IC is produced.

In the same way it's desirable to share simulation information with the 16500A logic analyzer for the purpose of stimulating a prototype printed circuitboard, it's desirable to transfer ASIC simulation information with the 82000 ASIC tester. Using link 5, the designer uses exactly the same stimulus to both verify the ASIC on EDS and on the ASIC tester. The prototype ASIC now can be verified in a shorter period of time because the stimulus doesn't have to be developed only transferred from EDS, as well as more thoroughly verified because the same data is being used in the design and prototype verification phases.

Simulation To Manufacturing Test

The time-to-market of electronic products is often the determining factor between success and failure of a product. The time to develop a manufacturing test program for printed circuitboards often exceeds the time required to design the board!

Links 6 and 7 greatly can reduce the time required to prepare manufacturing test programs by linking the design sys-

tems, EDS and PCDS, to the manufacturing board tester, either the HP 3065 or 3070.

Link 6 is another link that allows simulation information to be used on a system that tests hardware. In this case, EDS simulation information is reformat- ted and transferred to the tester so that the information used to test the board during the design phase may be used to test the manufacturing unit.

Link 7 transfers the printed circuitboard topology information from PCDS to the tester. The description of the board (i.e. the parts of which a board is comprise, their location, and the connectivity) now is present on the tester allowing a manufacturing test of the board to proceed.

Design Database To Corporate Database

Linking the design database to corporate database has long been overlooked. This is because primarily of the difficulty in accessing the design database. Extracting data and including data into the design database is typically a difficult undertaking. Because of the advanced database employed by EDS, a sophisticated Design Database Language (DDL) allows easy communication between these databases.

Link 8 allows such information as cost data to be loaded into the EDS database, and design data such as Bills of Material (BOM) to be extracted from the design database in any format and transferred to the corporate database.

This concept is new, yet has the potential to integrate aspects of the organization that have traditionally been considered independent of one another.

Design Documentation

The least desirable function in the development of a product is documentation. Designing a product and getting the product working are exciting in that the designer witnesses an idea become a reality. Documentation, unfortunately, isn't exciting.

Documentation never will be consid-

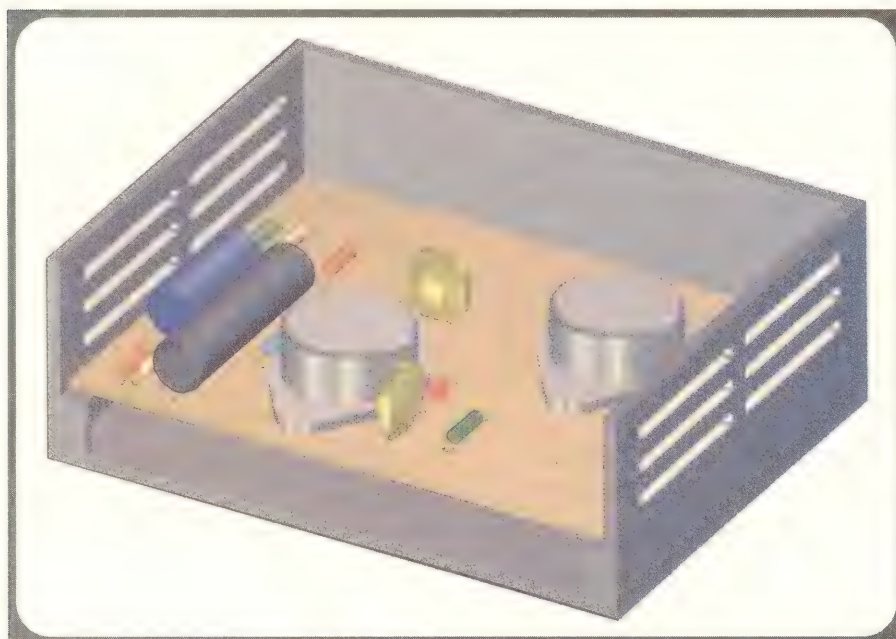


Figure 2: A printed circuitboard designed using PCDS.

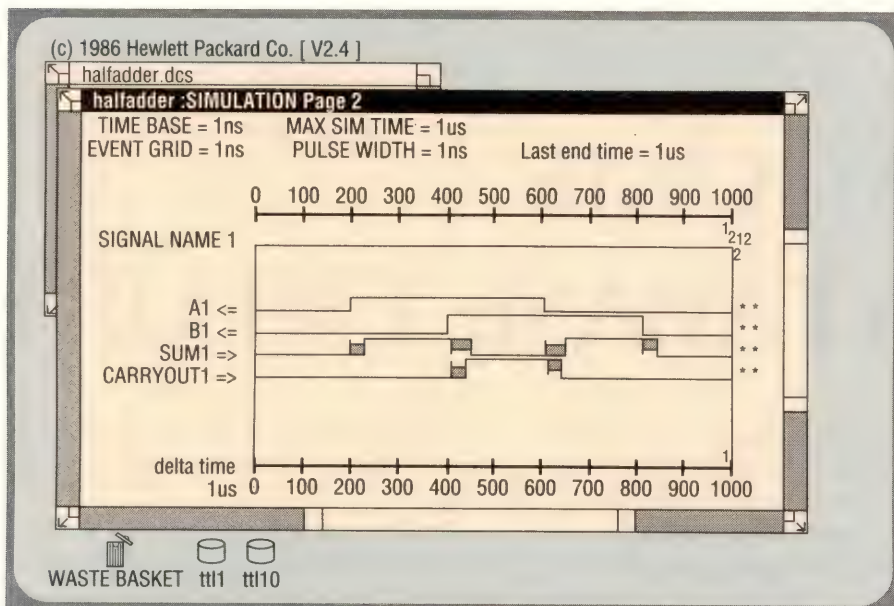


Figure 3: A comparison of the actual vs. the expected response of a circuit.

ered as glamorous as the other aspects of the development process, and we probably won't see many engineering graduates aspire to documenting a better widget rather than designing one. Documentation has indeed come a long way.

The FrameMaker desktop publishing tool, developed by Frame Technology, has the capability to read-in design drawings from all of the applications we have been discussing. In addition, the designer can make comments on the drawing and add text to the document in a what-you-see-is-what-you-get (WYSIWYG) format. This adds some challenge to creating documentation because creativity now can be exercised in creating a "flashy" piece of documentation rather than just a "wordy" document where some drawings have been "pasted" into the document.

Other FrameMaker features such as an automatic table of contents and pagination combine with the other capabilities of the tool to greatly improve the quality of engineering documents.

The Big Picture

The days when engineering disciplines worked independently of one another have passed because of the many advantages of integrated design and test environments.

The fact that simulation data can be shared among many systems, that the mechanical aspects of a system may be evaluated before any sheet metal is cut, and that fewer design errors make it to the prototype stage has the potential to revolutionize the development of electronic systems.

Many of the advantages I've discussed are a direct result of the applications running on HP-UX workstations. Although many of the applications were developed by HP, others, such as the HILO-3 simulator of EDS (a GenRad product), and FrameMaker (a Frame Technology product) are vital to making DesignCenter a complete design and test environment. DesignCenter will evolve to include other design and test tools as these tools become available. —Marty Poniatowski is an applications representative in computer aided engineering for Hewlett-Packard, Darien, CT.

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OVERCOME DATABASE FAILURE

Preventative Medicine To Minimize Recovery Headaches

Database failures and resultant recovery efforts cost HP 3000 users thousands of dollars every day in lost processing time and inconvenience. However, some basic database design and implementation procedures can act as proverbial "ounces of prevention" protecting you and your company from having to needlessly exist and suffer with logically and physically broken databases.

IMAGE Failure Modes

A quick review of image failure modes reveals that common occurrences as system failures or hangs, disc media failures, datacomm line failures or application failures can all bring database processing to a screeching halt. Failures also can result in physical or logical damage to the database. Physical failures result from having bad data on disc (filesys), broken chain pointers or inconsistent root files, while logical failures can result because of missed updates, puts or deletes, or missing delete flags. Whatever the cause, there are several standard and some new ways to repair the damage.

Classic IMAGE Recovery

A standard method of IMAGE recovery is to restore your most recent copy of your database and forward recover using DBRECOV. However, there are some problems with this recovery method. First and foremost, the process is extremely time consuming because it keeps users away from productive processing.

Also, DBRECOV uses a technique of recovery known as staging, where the restored DB is updated from the log file via staging files. The problem with staging is that large numbers of transactions can be ignored if an "end" is not found. Therefore, these transactions are not applied to the database. This creates a great deal

of time and effort spent on forward recovery, with no guarantee that the recovery will be complete.

If a failure occurs during an actual DB intrinsic such as updating, Intrinsic Level Recovery, (ILR) can ensure physical integrity of your database by undoing the intrinsic. The problem with undoing is that with IMAGE databases, in some instances, the log file and the database may not agree. Improvements made to Turbo-IMAGE have alleviated this problem.

TurboIMAGE Recovery

With turbo, ILR will complete the intrinsic call so that the log file and the database agree, as opposed to just undoing it. Turbo allows you to forward recover with DBRECOV as does IMAGE, but it also allows you to initiate a rollback recovery.

Rollback recovery is a more timely method of recovery because it eliminates the need for a DBrestore and to reapply logged transactions to the database. Rollback recovery allows users to bring their current database up, and back out the last incomplete transactions, while complete transactions are left in place.

The use of ILR and rollback recovery generally will ensure that more data is recovered than is possible with roll forward techniques. This is caused by the fact that ILR with rollback recovery requires physical logging.

Physical logging ensures that the changes to the database are recorded and written to the log file as they occur. This prevents the log record from remaining in memory where they can be lost in the event of a failure.

Despite the time saving that can be realized with Turbo's newer recovery features, neither these or IMAGE recovery procedures are of assistance with another common occurrence that results in logically broken databases —



RECOVERY

Teresa Brzozowski

program aborts.

Programming bugs, user errors and datacomm line failures are a few of the occurrences that can result in a database becoming logically corrupt. To date, HP 3000 users have had to live with the fact

to provide for an audit trail of physical transactions.

■ **Strong Locking** — Some method of strong locking should be implemented. Without strong locking, a transaction can interact with another transaction before

reductions in user downtime and the time spent in recovery procedures.

However, there is another alternative method of database recovery, Dynamic Rollback. When implemented with the aforementioned safeguards, it renders downtime either because of the initiating of recovery, or the existence of logically corrupt databases because of program aborts — a thing of the past.

A facility that provides a dynamic rollback actually will undo an aborted transaction as the abort occurs. The real-time removal of an aborted transaction allows your database to always be logically intact. Without the existence of incomplete transactions in your database, it also would be unnecessary to have to take the system down to initiate a cleanup. — *Teresa Brzozowski is marketing manager at Carolian Systems International, Ontario, Canada.*

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Physical logging ensures that the changes to the database are recorded and written to the log file as they occur.

that once databases have become logically corrupt, they have had to endure this inconvenience until a full recovery procedure can be initiated.

Problems Associated With Abort Recovery

Again, user downtime is the penalty that must be paid as users have to terminate, partial transactions are deleted or completed, and then users are allowed to access the machine again. However, if strong locking is not in place, the transaction interaction that has been rolled out can inadvertently undo a completed call. The real solution to this dilemma is to have a "net change rollback." This currently is unavailable, as a "net change" rollback requires a detailed and intimate knowledge of the application.

Solutions — How To Minimize Recovery Headaches

The benefit of facilities such as DBRECOV and rollback recovery are greatly enhanced if you implement the following safeguards:

■ **Turn on logging** — despite persistent misconceptions, logging does not significantly degrade the performance of your machine. If you are not logging you preclude yourself from virtually all methods of recovery.

■ **Use Begins and Ends** — Without DBbegins and DBends, by definition no logical transactions exist. Therefore, database logical integrity is impossible to determine. The best that can be done is

it has completed, thereby making the result of a rollback recovery questionable.

■ **Turn on ILR** — Turning on ILR will ensure that your database always will be physically intact.

Implementation of these key points is crucial if you are to ensure database integrity and ease of recovery for your company. They can result in tremendous

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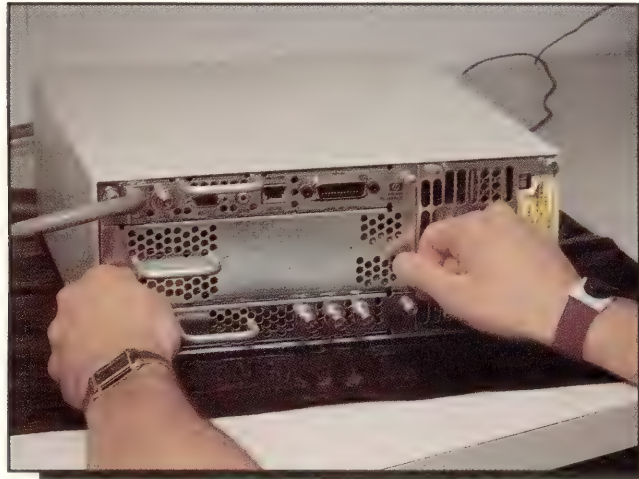


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Upgrading Your HP 9000 Workstations Can Be a Cost Effective Way To Enhance Your Systems' Performance



Workstation Adrenalin

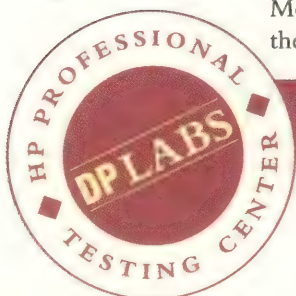
If you own an HP 9000 Model 310 or Model 370 and are looking for a fast, easy way to enhance your systems' performance, consider two user-installable upgrades offered by HP.

Both upgrades are easy to do. If you've done things like this before, the procedures take a matter of minutes.

To create this pictorial, HP was kind enough to lend us two workstations, a Model 310 and a Model 350, along with the upgrade hardware.

Photo sequence A shows a 350 to 370 upgrade. Sequence B is a 310 to a 332 upgrade.

Some prerequisites are needed before doing the upgrades. The Model 370 requires Revision 6.2 of HP-UX. The Model 332 requires HP-UX Revision 6.5. BASIC must be upgraded to Revision 5.13. PASCAL needs to be upgraded to Revision 3.22. You must upgrade your systems' software as appropriate for your situation *before* doing the hardware up-



David B. Miller

Workstation Upgrade

SYSTEM REQUIREMENTS: 310 to 332 Upgrade: Requires an HP 9000 Model 310 running HP-UX Revision 6.5 The 332 also supports BASIC Revision 5.13 and Pascal Revision 3.22. 350 to 370 Upgrade: Requires an HP 9000 Model 350 running HP-UX Revision 6.2.

PRICING: Model 310 to Model 332, Upgrade: \$4,000,
Model 350 to Model 370, Upgrade: \$7,000.

HEWLETT-PACKARD COMPANY

HEADQUARTERS:

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Palo Alto, CA 94304
(415) 857-1501

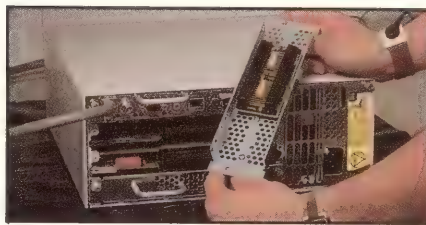
CIRCLE 300 ON READER CARD

grade. If you choose to do the hardware installation first, then re-install the appropriate version of HP-UX from scratch, all of your discs' data will be destroyed. Typing "uname -a" will display the revision number of HP-UX that you're running.

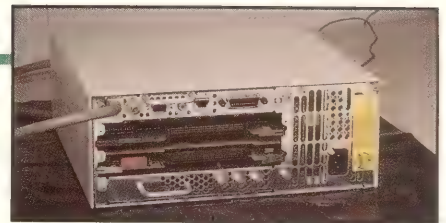
Specifically with the Model 310 to Model 332 upgrade, you need to check for, and possibly remove, some of your old boards. Old Model 310 RAM won't operate with the 332. It must be removed. HP 98620B DMA boards must also be removed. The Model 332 contains on-board DMA. HP warns that failure to remove these boards before the upgrade can result in a crashed system or cause a corrupted file system.

If your 310 contains an HP 98603A/B ROM BASIC board, it must be removed. The new processor board is not compatible with this Revision of BASIC.

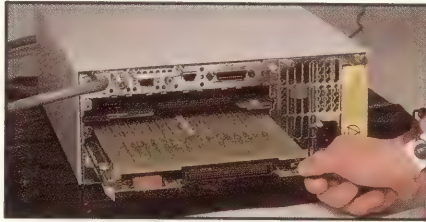
Your systems' components are sensitive to electrostatic shock. Perform these upgrades at a static free workstation, on an antistatic mat. Ground yourself with a wrist strap. Don't touch the boards' components or connectors. It might sound trivial, but remember to unplug everything before performing surgery inside the box. It's easy to forget. Don't rush. The performance edge gained from the upgrade will more than make up for the time spent doing the upgrade.



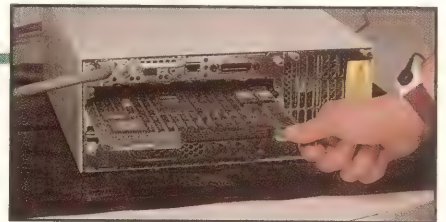
1a. Exercise care when removing the CPU/memory cover. You don't want to damage the connectors on the cover.



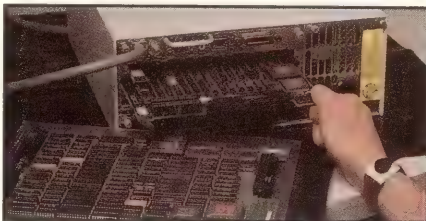
2a. With the cover off, you can see clearly the memory and CPU boards. You'll be hunting for the CPU board.



3a. Wrong board! This is the memory board. We want the CPU board.



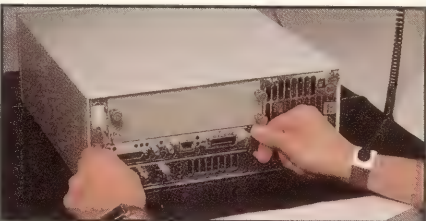
4a. Here it is. The 68020 processor is visible on the left side of the photo.



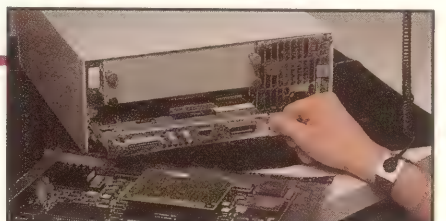
5a. The board swap is simple. Be sure the backplane connectors line up perfectly; a final nudge sets the board in place.



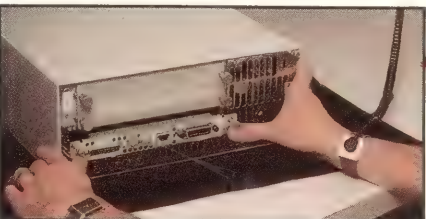
6a. When replacing the rear cover, make sure the connector pins mate properly with the connectors on the rear cover. You'll only get one chance.



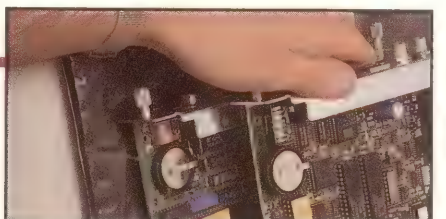
1b. CPU and I/O are combined on one board on the 310.



2b. The new CPU board in the foreground can be distinguished from the old board by the "chip sandwich" that exists in the middle of the new board. The new board has a bank of eight switches located near the battery. The old board's switch bank only has four pins.



3b. An extra step, not required in the 350 to 370 upgrade: the first four switches of the 8-switch bank on the new board must be set the same way as the 4-switch bank on the old CPU board.



4b. Install the new board in the same slot as the old one. If you intend to use the video driver on the CPU board, the board must go into the bottom slot. Our 310 came equipped with a separate graphics board that occupied the bottom slot.

A New Dimension

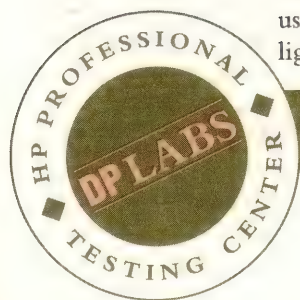
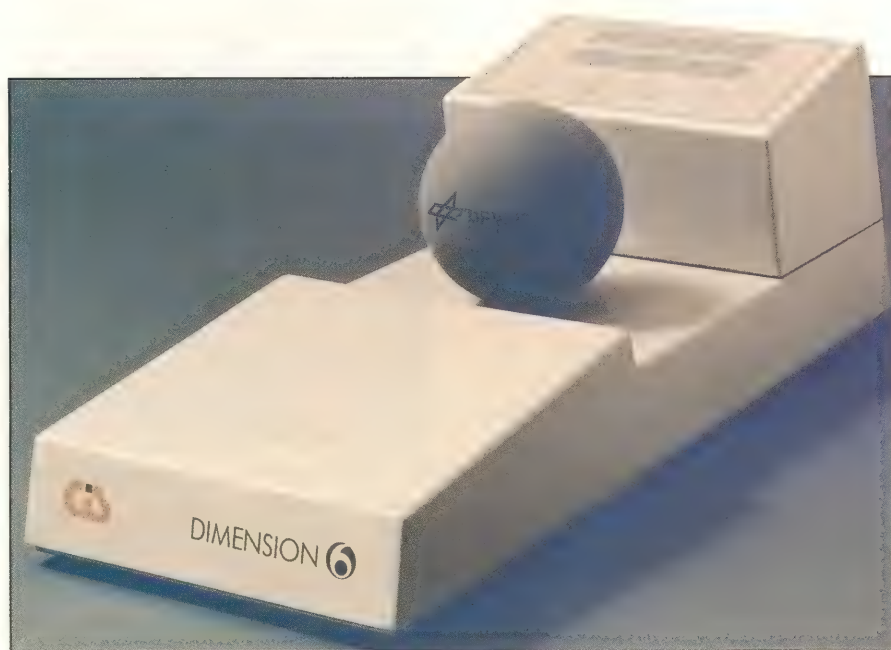
CIS Graphics Inc.'s Dimension 6 Graphics Ball Uses Infrared Optical Sensors

The number of potential markets for a peripheral input device as versatile as CIS Graphics Inc.'s Dimension 6 force/torque graphics ball is staggering. Using highly sophisticated customized software, it's applicable for screen object manipulation in such areas as engineering design, molecular modeling, stress analysis, architecture, robotics, animation and simulation.

The West Germany-based company entered the U.S. market about a year and a half ago and already has established several patents that cover a variety of designs in the device. The most intriguing is its use of infrared optics, which converts light-intensity alterations into digital

measurements for forces and torques. This increases the ball's response sensitivity over older methods, such as Strain Gauge technology, which consists of a mechanical response to pressure exerted on the device.

I tested the Dimension 6 on a Silicon



Evan Birkhead



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Graphics Iris 4D/120 GTX, its entry-level UNIX workstation that features two 16-MHz processors and the capability of sustaining 20 mips of scalar performance. It sports two 380-MB drives and a floating-point rate of 2 Mflops. For 3-D workstations, the interface is no different: Dimension 6 plugs into the mouse port. It also runs on a HP workstation.

Easy As X-Y-Z

The name Dimension 6 comes from the six directions of movement the device supports. For each of the three axes (X, Y and Z), it provides one translational movement (along the axis) and one rotational movement (around the axis). The workstation immediately reads and displays packets sent from the Dimension 6 whenever you move it.

There are three basic components to the device: the control ball, function keys and platform. The function keys include eight user-programmable buttons for commonly performed operations and three master switches that set the software for translational or rotational displays or for dominant displays. Dominant means that whichever axis is being pushed the most is the one that's displayed. Combinations of these buttons can set your system to any of six possible operating modes.

The board set is located in the base. Inside the ball are six position-sensitive LEDs that measure light intensity and, using a software matrix, calculate the change in force and torque that corresponds to the change in light. Three measure horizontal movements, and three measure vertical movements. The light passes through a ring in the ball socket that spins with hand movements, allowing the light to shine through thin slits. The board then measures the positive or negative force by the change in light.

My initial tendency was to rotate the ball rather than apply pressure to it. It also took a while to realize that the 3-D axes I perceived on the screen correlated precisely to the axes on the sphere in my hand. The most confusing aspect is that

the up and down Y axis correlates to the north-south axis on the ball. You push down to move down the screen, but my inclination was to pull toward myself.

Moving the ball toward and away from you affects the screen's Z axis. Pulling toward you enlarges images as they appear closer. Pushing away makes them smaller. You have to picture yourself above the workstation, rather than looking into it, or picture the ball as sitting inside your monitor.

Software Protocols

There are four software protocols selectable by dip switches located beneath the base. These include:

1. Standard ASCII (Voltage) protocol — This continuously sends ASCII data or voltages from the sensors within the ball.
2. Standard ASCII protocol — This sends computed forces and torques in an ASCII string.
3. Standard binary protocol — This is where one 12-byte block of binary data is sent on request.
4. Knobbox (dialbox) emulation — This sends data only when the ball is outside a defined zero position.

First determine which protocol your host system uses, then set the dip switches to the desired setting. This is described in the 14-page User's Manual, which overviews baud settings and other instal-

Dimension 6

PLATFORMS: RS-232-based 3-D graphics workstations

PRICE: \$3,300 for the device and cabling

CIS GRAPHICS INC.

HEADQUARTERS:
285 Littleton Rd., Ste. 3
Westford, MA 01886
(508) 692-9599

FOUNDED: 1974

PRODUCT LINE: Aerospace and engineering graphics products

OWNERSHIP: CIS Graphik, GmbH, Dusseldorf, West Germany

REVENUES: Approximately \$20 million (1988)

BRANCHES: Four West German and one Swiss

CIRCLE 328 ON READER CARD

lation procedures, patents and technical specs. It also provides maintenance and repair information.

The technology behind this device is remarkable. If you're in an environment that requires the manipulation of sophisticated graphics objects, you'll appreciate the power of the Dimension 6 and have fun learning to use it. —*Evan Birkhead is Senior Editor for DEC Professional and is a frequent contributor to HP Professional.*

Since Dimension 6 was reviewed, CIS Graphics has announced The Geometry Ball Series, an addition to the DIMENSION 6 family. The series consists of The Geometry Ball, Geometry Ball Jr., and Geoball.

Geoball is the independent force/torque control ball, including pick button control and RS-232 interface. It is offered as a standalone entity to OEM and system builders.

The Geometry Ball is a full-featured model that supports the Geoball mounted on a base with eight programmable function keys plus other operating features such as hardware handshake.

Geometry Ball Jr. utilizes the Geoball on a five-inch pedestal and is intended for users whose workstation space requirements are limited and/or whose application requirements are primarily concerned with control functionality provided by the force/torque ball.

The Geometry Ball Series is supported by a Geoball Software library that consists of a complete suite of "C" Language routines for both System V and Berkeley versions of UNIX.

List price for The Geometry Ball Series ranges from \$1,485 to \$1,995. The DI-6 model in standard configuration is now \$2,495.

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PC TIPS

Miles B. Kehoe

Directory Navigation

After reading last month's column, you now should

know how to create directories, how to make a directory your active directory, and how to remove unwanted directories. This month, I'll show you how to move around your directories, how to copy files from one directory to another, and how to manage files in a directory without having to change to that directory.

Here are some of the files and directories on my hard disc now. I'll use these as examples.

Root Directory Files:

```
AUTOEXEC.BAT
CONFIG.SYS
COMMAND.COM
```

I also have three directories at the root level:

```
BAT
BIN
TEMP
```

The content of these directories is as follows:

BAT Directory Files:

```
EMM.BAT
NU.BAT
DRAWGAL.BAT
```

BIN Directory Files:

```
NU.COM
CHKDSK.COM
WH.COM
SEE.EXE
```

TEMP Directory Files:

```
none
```

Furthermore, in the \BIN directory, I have two subdirectories:

```
PUB
UTIL
```

The full names of these subdirectories are \BINUB and \BIN\UTIL respectively.

Suppose I wanted to copy all the files in the C:\BIN directory to the \TEMP directory.

The simplest approach is to move to the destination directory (\TEMP) and copy the files. The commands are:

```
CD \TEMP
COPY \BIN\*.*
```

This copies all files in \BIN to the current directory, \TEMP. Note that the drive designator is optional here because both subdirectories are on the same disc.

If the \BIN directory were on a different drive, I simply would specify that drive name as well:

```
CD \TEMP
COPY D:\BIN\*.*
```

The current directory doesn't need to be the current one to copy files to it:

```
CD \
COPY \BIN\*.* \TEMP
```

This will copy all the files in \BIN to the directory \TEMP. Use care though: If there's no directory named \TEMP, the COPY command will create a single file called TEMP in the root directory and copy all files in \BIN into it. As far as I know, there is *no* easy way to get those files out again. In fact, if there are any programs or binary files, it may be impossible to recover them.

Fortunately, the COPY command doesn't erase files from the source directory. So, be sure you haven't misspelled the name of the directory you thought

I mportant data and programs should be kept separate.

was going to get all your files.

Finally, if I make the \BIN directory the working directory, I just need to specify the wildcard file specification:

```
CD \BIN
COPY *.* \TEMP
```

Incidentally, none of these methods will copy the UTIL and PUB subdirectories nor the files they contain. I'll say more about this later when I talk about the XCOPY command.

Deleting files is very similar. To remove all the files that are in the \TEMP directory, I can make \TEMP the current directory and delete the files:

```
CD \TEMP
DEL *.*
```

Alternatively, I can delete the files by simply specifying the full file names:

```
DEL \TEMP\*.*
```

Or, because of the way MS-DOS treats a directory, I can give just the directory name:

```
DEL \TEMP
```

One Level Lower

Notice that the \BIN directory has both files and subdirectories. One way to list the files in the UTIL directory within

\BIN is to change to that subdirectory and list them:

```
CD \BIN\UTIL
```

I also could list them by giving the full file names:

```
DIR \BIN\UTIL
```

If \BIN is the current directory, you can refer to UTIL without the leading \. In fact, you can't refer to \BIN\UTIL as \UTIL at all: The initial \ tells MS-DOS that this file is at the top, or root, level. However, you can tell MS-DOS how to find UTIL relative to \BIN:

and

```
DIR .\UTIL
```

both list the same files. Note that the dot says "starting at the current directory level use the directory named \UTIL." Without the dot, MS-DOS will attempt to list the files in the UTIL directory at the root level. On my disc, at least, it will fail because there is no \UTIL directory.

Double Dot

If you're in a subdirectory, and do a DIR command, you'll see two special files: dot (.) and double-dot (..). As you saw in last month's column, the single dot is shorthand for "the current directory" and double dot is shorthand for "the current subdirectory's parent directory," the directory "above" the current one.

If the \BIN directory is the current working directory, you can list the files in the "root" directory by using any of the following commands:

```
DIR \
DIR \*. *
DIR ..
DIR ..\
DIR ..\*. *
```

If you change to the \BIN\UTIL directory, the command:

```
DIR ..
```

will show you the files in \BIN, because the parent directory to \BIN\UTIL is \BIN. I can use this relative pathname anywhere on the disc.

Copying Full Directories

Because you often will find the need to copy a complete directory, including any subdirectories, Microsoft introduced a new command with Version 3.0 of MS-DOS, XCOPY.

XCOPY is similar to the COPY command because it allows you to copy files from one drive or directory to another drive or directory. Unlike COPY, XCOPY allows you to specify that all subdirectories are to be copied as well.

Suppose you wanted to make a duplicate of the \BIN directory I discussed above. By entering the command:

```
XCOPY \BIN D:\BACKUP /S/E
```

you can do it all in one step. The /S and /E direct XCOPY to copy recursively, that is all the subdirectories as well as files; and to create any subdirectories that don't exist on the destination drive. I suggest you check with your system documentation, because this command is very useful in the daily use of your system. In fact, I use XCOPY to make a backup copy of my hard disc once a week over our network to another disc. XCOPY works fine.

Directories and subdirectories are convenient ways to keep your important programs and data separate, yet still allow MS-DOS to access files as fast as possible on your disc. I encourage you to experiment with directories and subdirectories — perhaps on a flexible disc rather than your hard disc — until you feel comfortable with the concepts. Then you can get your hard disc organized and really working for you! —Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.

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RDBMS

Fabian Pascal

Powerful Derived Operations

product, restrict and project table operations. Here I'll discuss two additional derived operations, as well as two useful extensions to join and union. Again, the examples will be based on our software management database in *Figure 1*.

Intersect

As discussed in the September column, to find all information about departments *without* assigned employees I used the difference operation. It "subtracts" from DEPARTMENTS the rows whose DEPT# values occur in EMPLOYEES, therefore leaving in the result only those DEPT# rows unique to DEPARTMENTS. The result is shown in *Figure 2*.

On the other hand, to find all information about departments *with* employees you need to include in the result precisely those rows excluded by difference; i.e., those whose DEPT#s are common to both tables. *Figure 3* illustrates the operation and shows its result.

We can express intersect as a natural join (but not always the other way around), because it is a special case of the join.

Quiz: What table operation, if applied to the results in *Figure 2* and *3*, would yield the DEPARTMENTS table?

Divide

DIVIDE is a very powerful derived operation. To make it easy to understand, I will use simplified database tables. Assume that the ACTIVITIES table contains only three types of activity, whose ACT#s are 70, 80 and 180, as shown in *Figure 4*. The figure also shows a revised and sim-

pler ALLOCATIONS table.

Now suppose we want to find the PROJ# of all the projects to which all three types of activity were allocated. Going over the ALLOCATIONS table, we see that project MA2113 has only one type of activity (70) allocated to it, OP1010 also has one (180), and MA2112 has two (70, 180). The only two projects to which all three activities were allocated are AD3112 and AD3113. This is exactly the result that the divide operation yields,

as *Figure 4* shows.

Of course with the small and simple tables, it was easy to figure out the result simply by inspecting them. But with larger and more complex tables, results of divide aren't that obvious, and it's there that it's really useful. The need for it is actually quite common. For example, in a database with a SUPPLIERS table and a PARTS table where every supplier can supply many parts and every part can be supplied by many sup-

FIGURE 1.

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.		
D01	DEV. CENTER		A00
D11	MFG. SYSTEMS	160	D01
D21	ADM. SYSTEMS		D01
E01	SUPPORT SVCS		A00
E11	OPERATIONS	310	E01
E21	SOFTWARE SUPPORT	100	E01

DEPARTMENTS Table

PROJ#	ACT#	BEGIN	END
MA2112	70	1/1/82	7/1/82
MA2112	180	7/1/82	2/1/83
MA2113	60	2/15/82	9/1/82
AD3112	60	1/1/82	3/15/82
AD3112	70	1/1/82	10/15/82
AD3112	80	8/15/82	12/1/82
AD3112	180	8/15/82	1/1/83
AD3113	70	6/1/82	12/15/82
AD3113	80	1/1/82	4/15/82
AD3113	180	3/1/82	7/1/82
OP1010	130	1/1/82	2/1/83

ALLOCATIONS Table

PROJ#	PNAME	ERESP	STAFF
MA2110	PROGRAMMING	60	9.00
MA2111	PROGRAM DESIGN		2.00
MA2112	ROBOT DESIGN	150	3.00
MA2113	PROD CONT PROGS	160	3.00
OP1010	OPERATION		5.00
OP2010	SYSTEMS SUPPORT	100	1.00
AD3112	PERSONNEL PROG	250	1.00
AD3113	ACCOUNT PROG		2.00

PROJECTS Table

ACT#	ACODE	ANAME
10	MANAGE	Manage/Advise
30	DEFINE	Define Specs
40	LEADPR	Lead Program/Design
60	LOGIC	Describe Logic
70	CODE	Code Programs
80	TEST	Test Programs
130	OPERAT	Oper Computer Sys
140	MAINT	Maint Software Sys
160	ADMDB	Adm Data Bases
170	ADMDC	Adm Data Comm
180	DOC	Document

ACTIVITIES Table

EMP#	ENAME	DEPT#	HIRED	SALARY	COMM
100	Spenser	E21	6/19/80		26150
150	Adamson	D11	2/12/72	25280	
160	Planka	D11	10/11/77	22250	
310	Setright	E11	9/12/64		15900
250	Smith	D21	10/30/69	19180	
260	Johnson	D21	9/11/75	17250	

EMPLOYEES Table

PROJ#	ACT#	EMP#	START	TIME
MA2112	180	150	7/15/82	1.00
MA2113	60	160	7/15/82	1.00
OP1010	130	310	1/1/82	1.00
AD3112	70	250	8/15/82	0.25
AD3112	180	250	8/15/82	0.50
AD3112	80	250	10/15/82	0.50
AD3112	60	250	1/1/83	1.00
AD3113	80	260	3/1/82	0.50
AD3113	180	260	4/15/82	1.00
AD3113	70	260	6/15/82	0.50

ASSIGNMENTS Table

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FIGURE 3.

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.		
D01	DEV. CENTER		A00
E01	SUPPORT SVCS		A00

DEPARTMENTS "Minus" EMPLOYEES.

pliers, divide can be used to answer the query, "Which suppliers supply all the parts?"

The Outer Extensions

Last month I mentioned the fact that some operations come in inner and outer versions. Union, difference, join, intersect and divide have inner and outer versions. The union, difference and join versions already discussed were the inner ones. Outer operations are extensions of the inner operations to make table manipulation more convenient in certain types of cases that involve missing or inapplicable data. Only the more common outer joins and unions are discussed here, to keep it simple.

Note: Outer extensions, where supported by DBMS products, should be used with extreme care. As I mentioned in past columns and will demonstrate in future ones, missing values create some very serious problems for databases.

Outer joins

To find names and salaries/commissions, and the names of their departments, you would have to join a projection of the EMPLOYEES table with one of the DEPARTMENTS on their common column DEPT#; i.e., you would perform an (inner) natural-join, by nesting projection and join operations. In our database, all employees are assigned to departments. But suppose the EMPLOYEES table was as shown in *Figure 5*; that is, it included a couple of unassigned employees.

The natural join excludes the unassigned employees from the result because their DEPT# values are missing and thus

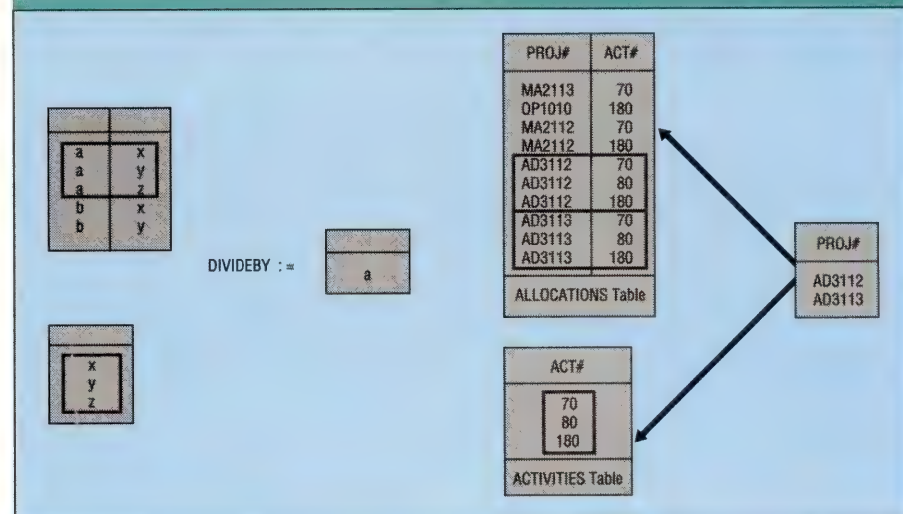
INTERSECT :=

DEPT#	DNAME	MGR#	RDEPT
D11	MFG. SYSTEMS	160	D01
D21	ADM. SYSTEMS		D01
E11	OPERATIONS	310	E01
E21	SOFTWARE SUPPORT	100	E01

DEPARTMENTS *Intersect* EMPLOYEES.

don't match any DEPT# value in DEPARTMENTS. But what if the query was for a report on overall project salaries where *both* assigned and unassigned employees need to be included? This is what the OUTER JOIN is for. The RIGHT OUTER JOIN extends a join to include the unassigned employees in the report, substituting missing values for the department name of each unassigned employees. It's called a right outer join because it includes rows from the table "on the right"; i.e., that specified as sec EMPLOYEES). *Figure 6* shows how it

FIGURE 4.



ALLOCATIONS Divide by ACTIVITIES.

works.

But what about the departments that don't have any employees? They're excluded by the inner join for the same reason the unassigned employees are, but the right outer join also has excluded them. To include them in the result, there's a `LEFT OUTER JOIN` which extends the join in that direction. The result is shown in *Figure 7*. Here "blanks" are substituted for the employee information (name and salary) for the departments without employees (i.e., the "left table," `DEPARTMENTS`).

Of course, we can include both departments without employees and unassigned employees in the result, in which case we would perform a SYMMETRIC (or left-right) OUTER JOIN. I leave this to you to figure out.

Note: Like inner operations, outer operations also can be performed on more than two tables. Because, as you can see in the case of joins, the table on the left or right affects the result, the user must be able to specify the sequence in which tables are joined to obtain the correct result.

Outer Union

To understand what an outer extension to union is, let's go back to the EM-

FIGURES 5-10.

EMP#	ENAME	DEPT#	HIRED	SALARY	COMM
100	Spenser	E21	6/19/80		26150
150	Adamson	D11	2/12/72	25280	
155	Pascal		5/10/84	31800	
160	Pianka	D11	10/11/77	22250	
310	Setright	E11	9/12/64		15900
250	Smith	D21	10/30/69	19180	
255	West		11/02/77		16000
260	Johnson	D21	9/11/75	17250	

Figure 5: EMPLOYEES with unassigned employees.

ENAME	SALARY	COMM	DNAME
Spenser		26150	SOFTWARE SUPPORT
Adamson	25280		MFG. SYSTEMS
Pascal	31800		
Pianka	22250		MFG. SYSTEMS
Setright		15900	OPERATIONS
Smith	19180		ADM. SYSTEMS
West		16000	
Johnson	17250		ADM. SYSTEMS

Figure 6: Right Outer Join

ENAME	SALARY	COMM	DNAME
			COMPUTER SVCS DIV. DEV. CENTER
Spenser		26150	SOFTWARE SUPPORT
Adamson	25280		MFG. SYSTEMS
Pianka	22250		MFG. SYSTEMS
Setright		15900	OPERATIONS
Smith	19180		ADM. SYSTEMS
Johnson	17250		ADM. SYSTEMS
			SUPPORT SVCS

Figure 7: Left Outer Join

EMP#	ENAME	DEPT#	HIRED	SALARY
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250

SAL_EMPL Table

EMP#	ENAME	DEPT#	HIRED	COMM
100	Spenser	E21	6/19/80	26150
310	Setright	E11	9/12/64	15900

COMM_EMPL Table

Figure 8: Split EMPLOYEES table.

EMP#	ENAME	DEPT#	HIRED	COMM
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250
100	Spenser	E21	6/19/80	26150
310	Setright	E11	9/12/64	15900

Figure 9: Inner union.

EMP	# ENAME	DEPT#	HIRED	SALARY	COMM
150	Adamson	D11	2/12/72	25280	
160	Pianka	D11	10/11/77	22250	
250	Smith	D21	10/30/69	19180	
260	Johnson	D21	9/11/75	17250	
100	Spenser	E21	6/19/80		26150
310	Setright	E11	9/12/64		15900

Figure 10: Symmetric outer union.

EMPLOYEES table split into two tables: salaried (SAL_EMPL) and commissioned (COMM_EMPL) employees, as shown in Figure 8. Let's also assume that salary and commission are mutually exclusive.

If we apply the basic, inner union to the two tables, we get the result in Figure 9.

If, however, we want to obtain the original EMPLOYEES table in Figure 1, we need to apply the SYMMETRIC (or left-right) OUTER UNION to the two tables. The two tables' union compatibility is preserved by adding the columns that are unique to each (here, SALARY and COMM), and by substituting missing values as Figure 10 shows.

There also is a LEFT OUTER UNION

and a RIGHT OUTER UNION, similar in principle to their join counterparts.

Domain Check Overrides

Any table operations where values in columns not drawn from the same domain are compared should not be allowed by the DBMS as a matter of course. However, there may be special instances when specific users should be authorized to override system domain checking for particular purposes. These extensions to the regular data operations involved are called DOMAIN CHECK OVERRIDES.

— Fabian Pascal is president of micro-paSQL, an independent Washington, DC, consulting firm specializing in relational database management and SQL on the PC.

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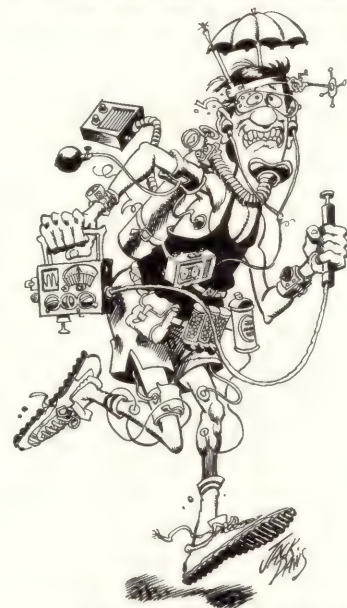


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HP-UX

Andy Feibus

Time-Oriented Utilities

This month's column is devoted to the HP-UX time-oriented utilities **cron**, **at** and **calendar**. User documentation for these utilities is available in the *HP-UX Reference Manuals*.

If you're not familiar with these utilities, it's a good idea to review the information available on the mail utility and become familiar with sending and receiving electronic mail messages. Mail is used by **cron** and **at**, as described later.

Cron, which is usually started when the system is booted, is used to schedule tasks automatically for execution on a periodic basis. These tasks usually include nightly system backup and periodic purging of the files in **/tmp** and **/usr/tmp**.

You may have **cron** execute your own tasks by creating a *crontab* file (a file containing commands for **cron** to execute). A crontab file consists of a series of lines containing the following six fields (separated either by spaces or tabs):

```
minute hour day month weekday command
```

where:

minute	The minute(s) of the particular hour on which the command is to execute (0 - 59).
hour	The hour(s) of the particular day on which the command is to execute (0 - 23).
day	The day(s) of the particular month on which the command is

day (cont'd.)	to execute (1 - 31). This field is used to specify certain days in addition to the weekday field.
month	The month(s) of each year on which the command is to execute (1 - 12).
weekday	The day(s) of the week on which the command is to execute (0 - 6, where 0 = Sunday and 6 = Saturday). This field is used to specify certain days in addition to the day field.
command	The command to execute (full path names should be used).

Each field may be formatted any of the following ways:

- As a single number (e.g., 7).
- As two numbers separated by a hyphen (e.g., 1-5) to indicate a range of numbers.
- As a list of numbers separated by commas (e.g., 1,8,12) to indicate a set of specific numbers.
- As an asterisk (*) to indicate all numbers within the range of a field.

The following is an example of a crontab file:

```
20 5 * * * find /tmp /usr/tmp
-type f -mtime +5 -exec rm {} \;
15 20-8 * * 1-5 ps -ef
1 0 * * 1-5 banner "Good Morning!" |
/bin/mail usera
```

The first line of the file will remove any files older than five days from the **/tmp** and **/usr/tmp** directories every day at 5:20 a.m. The second line obtains

a copy of the current system status hourly from 8:15 p.m. until 8:15 a.m. from Monday through Friday. Because of the weekday restriction, the status is only reported on Monday from 12:15 a.m. until 8:15 a.m. and on Friday from 8:15 p.m. until 11:15 p.m. The last line causes a banner message to be mailed to *usera* each morning at 12:01 a.m.

All information written to standard output or standard error by a task is routed by **cron** to the user's electronic mail location (or mailbox). The user then receives this information by using the **mail** command.

To cause a series of commands to be executed for you by **cron**, use the **crontab** command. Create a crontab file and execute:

```
$ crontab cfile
```

where **cfile** is the name of the file containing the **cron** commands to execute. **Cron** tasks execute as the user that requested the task (e.g., if you are user *usera*, **cron** executes the tasks you request as *usera*) and all permissions and restrictions associated with the user are enforced. **Cron** executes these tasks using Bourne Shell (**/bin/sh**) and defines the **HOME** (your default directory), **LOGNAME** (your login name), **SHELL** (**/bin/sh**), and **PATH** (**/bin:/usr/bin**) shell variables. **Cron** executes your tasks from your **HOME** directory.

If the **crontab** command responds with:

```
crontab: you are not authorized
to use cron. Sorry.
```

request that your system administrator either remove your login name from the **cron.deny** file or add your login name to the **cron.allow** file (both files reside in **/usr/lib/cron**). These files control

user access to **cron**.

To list the commands to be executed for you by **cron**, execute the command:

```
$ crontab -l
```

To stop **cron** from executing commands for you, execute the command:

```
$ crontab -r
```

One command that usually is executed via **cron** by the root user is the command:

```
calendar -
```

This checks the **HOME** directory of all users for a file named **calendar**. This file is examined and all lines containing either today's date or tomorrow's date are written to standard output (which **cron** then routes to the user's mailbox).

On Friday, the "tomorrow" scan includes Saturday, Sunday and Monday. **Calendar** does not recognize any holidays.

Part of my calendar file is shown below:

```
Dec 5 : Dad's Birthday (call him)
12/5 : Judy's Birthday (call her)
December 18: Get skis waxed for trip
12/29: Mom's Birthday (call her)
12/31: New Year's Party at Scott's House
1/1: Stay home - watch football.
Jan 15 - Leave for ski trip to Vail
```

On December 15 and 18, the message:

```
December 18: Get skis waxed for trip
```

will automatically be mailed to me. On December 28, I will receive the message for December 29; on December 29, I will receive the messages for 12/29, 12/31, and 1/1, because 12/29 is Friday.

If you want to see your **calendar** for today, you can execute the **calendar** command at any time (no command arguments needed) and the output is displayed on your terminal.

Whereas **cron** is used to execute a command on a periodic basis, usually when the system is not busy, the **at** command is used to execute a series of commands at a specific time.

At is executed using one of the following commands:

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```
$ at [time] [date] [increment] < cmdfile
```

or

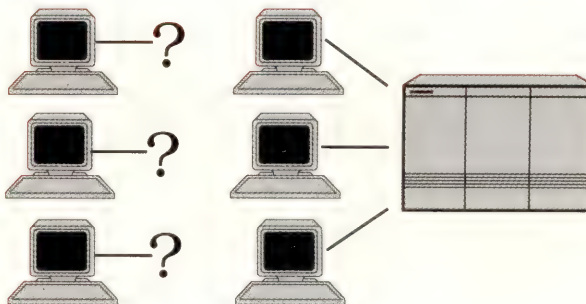
```
$ at [time] [date] [increment]
command
^D
```

where **cmdfile** is a file containing the commands to execute and **command** is a command that's entered at the key-

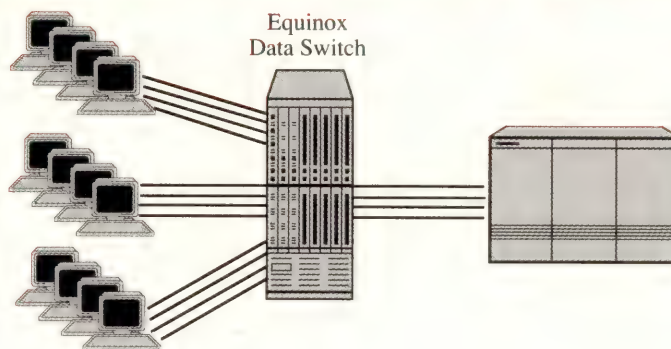
board. **Time**, **date** and **increment** are described below.

The **time** format may contain one (e.g., 9 for 9 am), two (e.g., 21 for 9 p.m.), or four digits (e.g., 1135 for 11:35 a.m.), or two numbers separated by a colon (e.g., 12:15). **Time** may be appended optionally with either **am** or **pm**; if not, then **time** is assumed to represent a 24-hour clock. Special **time** keywords **noon**, **midnight** and **now** are also ac-

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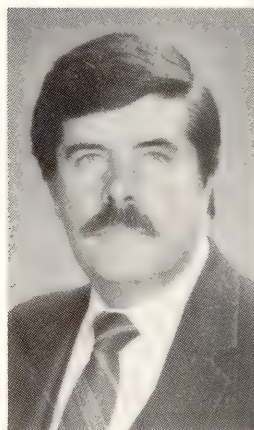
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cepted (**now** is the default if a special time is not specified).

The **date** format may contain either the month and day (e.g., **May 9**) or the month and day followed by a comma and the year (**January 19, 1991**). The month may be abbreviated by using the first three letters of the month's name. Date may also be specified by the day of the week (e.g., **Thursday**); the day of the week also may be abbreviated to the first three letters of the same day. Special **date** keywords **today** and **tomorrow** also may be used. If no **date** is specified, either **today** or **tomorrow** is used as a default depending on whether the time specified is before (**tomorrow**) or after (**today**) the current time.

Increment provides a method of specifying relative time and is of the form **+ n units**, where **units** is one of **minute**, **hour**, **day**, **week**, **month** or **year** (either the singular or the plural of these keywords is permitted). For example, **now + 3 weeks** is used to indicate 21 days from the current time and date.

Some example times that may be used with **at**:

```
Noon Mar 25
3 pm February 12, 1990
1600 Tomorrow
2359 (11:59 p.m. today)
now + 2 days (exactly 48 hours from now)
```

When **at** is invoked with a set of commands to execute, a job number and the time/date for the execution are displayed as follows:

```
Job 629782740.a at Fri
Dec 15 22:39:00 1989
```

To list which jobs are to be executed for you by **at**, use the command **at -l**. To prevent **at** from executing a specific job, use the command:

```
$ at -r job_number
```

where **job_number** is the job number as returned either by **at -l** or when the command was executed.

Output from an **at** execution is routed to your electronic mailbox. The Bourne Shell is used to execute all **at** commands. When an **at** job is submit-

ted, the currently defined shell variables and the current directory are remembered. When **at** executes the job, the shell variables are restored and **at** executes the commands within the remembered directory.

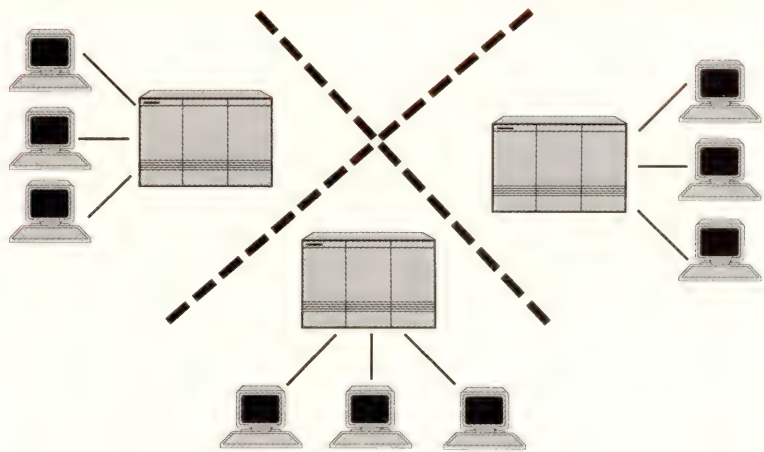
If the **at** command returns the error message:

```
at: you are not authorized to use at. Sorry.
```

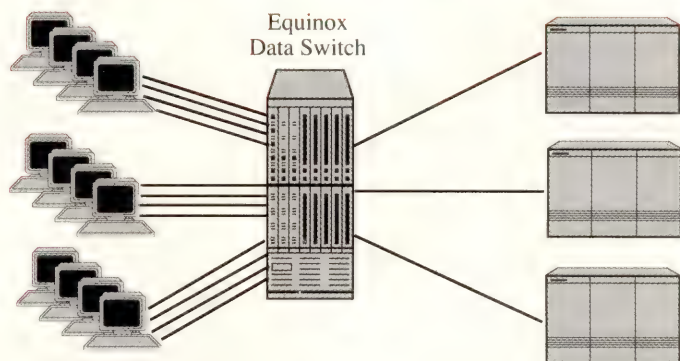
request that your system administrator either remove your login name from the **at.deny** file or add your login name to the **at.allow** file (both files reside in **/usr/lib/cron**). These files control user access to **at**. —*Andy Feibus is president of Processware Inc., Atlanta, GA.*

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NEW PRODUCTS

Continued from page 26.

is designed to filter data at speeds up to 20,000 packets per second at each LAN. It's fully compatible with IEEE 802.5 protocol specifications. It also is transparent to upper level protocols such as SNA, PC LAN, TCP/IP, 3270 emulation, XNS and SMB.

The ConnectLAN 211 has a list price of \$11,500.

Contact Halley Systems, 2730 Orchard Parkway, San Jose, CA 95134; (408) 432-2600.

Circle 378 on reader card

Digi-Mux Multiplexor Yields Major Savings

Black Box Corp. has introduced the Digi-Mux Multiplexor. Now, users of sync PCs, terminals or printers can realize savings in line and modem costs.

As many as six sync devices can be hooked via Digi-Mux to a single transmission DDS line connected to a remote host. Digi-Mux features front-panel LEDs for data-rate selection, configuration and diagnostics. You can run local and remote diagnostics on each channel separately, analyzing any problem quickly.

Contact Black Box Corp., Mayview Rd. at Park Dr., Box 12800, Pittsburgh, PA 15241; (412) 746-5500.

Circle 385 on reader card

New Service Certifies Tape Degaussing Equipment

Computer-Link Corp. has announced a Tape Degausser Calibration Verification Service to provide certification

of tape degaussing equipment. The service allows tape users to be certain that their degaussing equipment has completely erased sensitive data from a tape. Computer-Link's service allows the degaussing equipment to remain in use at the customer's site.

The service, available for \$135 to \$290, uses a prerecorded tape supplied by Computer-Link. The tape is erased by the customer and the erased tape is returned to Computer-Link where a thorough spectral analysis of any remaining data is plotted. If the tape is free of data, the degausser is certified to be operational and test results verifying this are provided.

Contact Computer-Link Corp., 3 Lopez Rd., Wilmington, MA 01887; (508) 657-8820.

Circle 389 on reader card

Viking Overhauls Software Line

Viking Software Services Inc. has announced a major revision to its entire product line of data entry and screen forms management software.

In addition to its basic forms development software, VMS, Viking's Version 3.0 also applies to the Viking Data Entry (VDE),

Viking Data Manager (VDM) and Viking Control System (VCS) software packages.

Version 3.0 features an open system that can be customized to meet special needs. Extensive use of pop-up and pull-down menus, an expanded options parameter system and a new file conversion utility fulfill the majority of custom programming previously required.

Contact Viking Software Services Inc., 4808 E. 67th St., Suite 100, Tulsa, OK 74136-4959; (918) 491-6144.

Circle 379 on reader card

Zentec 9394c Colorizes HP Applications

Zentec Corp.'s new Zentec 9394c terminal, compatible with HP's 700/94 model, colorizes all HP applications with no special codes or mainframe programming needed.

This terminal incorporates the company's Genisys packaging design in which the terminal's logic is housed in a wedge-shaped external unit instead of the monitor enclosure that is typical with other terminals.

The terminal also consists of a 14-inch flat screen VGA color monitor and a 108-key keyboard. Prices range from \$900 to \$1,150 depending on order quantity.

Contact Zentec Corp., 2400 Walsh Ave., Santa Clara, CA 95051 (408) 727-7662.

Circle 380 on reader card

Meta-Software Upgrades HSPICE

Meta-Software Inc. has announced an upgraded version of its optimizing analog circuit simulator, HSPICE. The new HSPICE version features new simulation capabilities, new models, ports to seven more platforms and enhanced CAE system interfaces.

Meta-Software's new HSPICE release interfaces to frameworks from Silicon Compiler Systems on Sun-3 and Sun-4; Cadence on Apollo, Sun-3, Sun-4 and VAX ULTRIX platforms; Zuken AWS on HP and NEC 4800 workstations; VIEWlogic Workview on the PC386, Sun-3, Sun-4, DECstation 3100, DECstation 2100, and VAX/VMS; and Valid's Analog Workbench on Sun-3 and Sun-4.

Contact Meta-Software Inc., 1300 White Oaks Rd., Campbell, CA 95008; (408) 371-5100.

Circle 392 on reader card



Viking Forms Manager features include the expanded use of pop-up and pull-down menus and new supervisory capabilities.

Oregon Software Ports Oregon C++ To HP 9000/300

Oregon Software Inc. ported Oregon C++ to the HP 9000/300 workstation. This implementation joins the Sun-3, Sony NEWS and Xenix/386 C++ compilers previously released.

Oregon C++ is a true C++ compiler and is shipped with a source-level debugger, a complete ANSI C library and a library compatible with the AT&T stream I/O library for C++. The C compiler will conform to the latest ANSI C draft standards.

The product is priced at \$1,900 for a single-user license.

Contact Oregon Software Inc., 6915 S.W. Macadam Ave., Suite 200, Portland, OR 97219-2397; (503) 245-2202.

Circle 357 on reader card

Cognos Enhances Architect For MPE XL

Cognos Inc. announced PowerHouse ARCHITECT 5.09 for HP MPE XL systems. This latest version provides the same feature already available to MPE V users, which includes a menu-driven interface to the QUIZ report writer that allows users to construct or modify the layout of a report, without having to initiate changes in QUIZ.

Enhancements to the product's pushbutton prototyping capabilities make it possible to select individual files from a dictionary to develop prototypes, as well as to define relationships between files.

The new version also makes PowerHouse ARCHITECT available to MPE XL customers who have PowerHouse Reporting-Only licenses or leases.

PowerHouse ARCHITECT is a maintenance toolset for PowerHouse 4GL applications that automates prototype development, documentation and impact analysis.

Contact Cognos Inc., 3755 Riverside Dr., Ottawa, Ontario K1G 3Z4; (613) 738-1440.

Circle 362 on reader card

Interbase Software Supports HP Precision Architecture

Interbase Software Corp. ported its InterBase relational database product to the HP-PA systems, including the HP 9000 Series 800 minicomputers and the recently announced HP 9000 Model 635S server.

With the addition of the HP-UX system,

InterBase now supports distributed database processing among HP's RISC-based UNIX line HP's entire Apollo line.

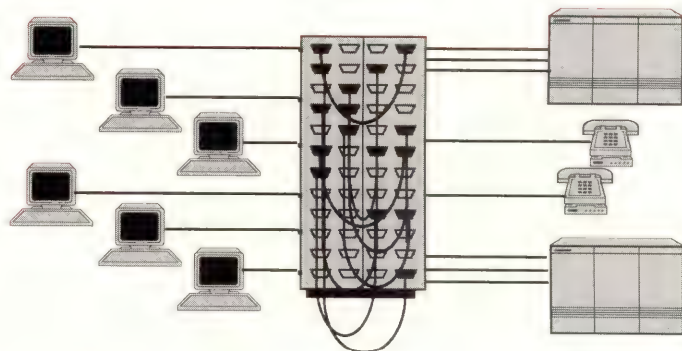
InterBase is an advanced relational DBMS that includes a complete set of database utilities and program development tools. The InterBase technology is suitable for system builders and developers of complex applications.

InterBase eventually will run on the entire HP line. The price of InterBase on the HP 9000 Series 800 will range from \$2,000 to \$70,000, based on configuration.

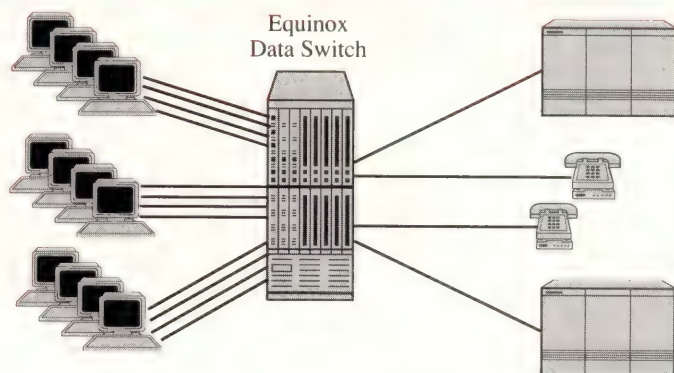
Contact Interbase Software Corp., 209 Burlington Rd., Bedford, MA 01730; (617) 275-3222.

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NEW PRODUCTS

DoubleDisk Doubles Hard Disc Space

Vertisoft Systems Inc. has announced DoubleDisk, an online disc utility that doubles the space on a hard disc. It can be installed quickly and operates continuously, and in a manner completely transparent to the user.

DoubleDisk's Extended Disk is a standard DOS drive, so you can continue using your applications as usual. DoubleDisk features a data security scheme through password protection and data encoding.

Contact Vertisoft Systems Inc., 100 California St., Suite 1400, San Francisco, CA 94111; (415) 956-6303.

Circle 391 on reader card

VENUS/3000 Automates Batch Job Management

V&S Associates has announced the release of version 4.03 of VENUS/3000, a batch job management system that automatically maintains batch job files and executes these

jobs according to user-definable schedules.

VENUS employs user-definable parameters for dates, passwords and other variable data commonly found in stream job files; thus the user performs stream job maintenance just once, by placing these parameters in his stream job files, and from then on these jobs will be maintenance-free. The VENUS system automatically monitors batch job activity and provides online and offline reporting of such activity.

VENUS doesn't require PM capability and has complete online help and manual. Prices vary from \$1,295 for the HP 3000/3x to \$4,495 for the HP 3000/95x.

Contact V&S Associates, P.O. Box 548, Escalon, CA 95320; (209) 838-2326.

Circle 375 on reader card

Adobe Systems Offers PostScript Cartridge

Adobe Systems Inc. has announced an implementation of the Adobe PostScript interpreter for the HP Laserjet IID printer.

The implementation is contained in a cartridge and will be offered from Hewlett-Packard.

In addition to PostScript capability and easy printer-sharing, the new Adobe PostScript cartridge also gives IBM PC compatible users connectivity to other Adobe PostScript output devices, such as typesetters and color film recorders.

The new product is priced at \$995. This includes the PostScript interpreter, licensed from Adobe Systems, and 35 Adobe typefaces.

Contact Adobe Systems Inc., P.O. Box 7900, Mountain View, CA 94039; (415) 961-4400.

Circle 373 on reader card

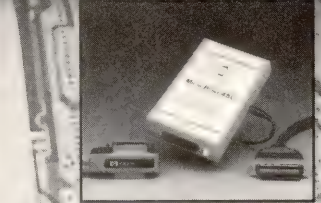
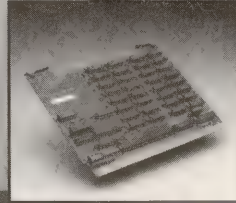
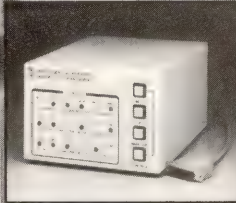
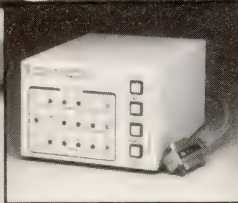
National Instruments Offers Five New Products

National Instruments has announced the availability of five new IEEE-488 products.

Two new high-performance boards have been developed for the IBM PC that convert standard serial and parallel data to IEEE-488

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free 286/386 PC workstations. Realize all the computer utilization efficiencies during printer/plotter operations as the MicroPlot 80/70 Series. Same features plus:

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MicroRAM - \$775

1 megabyte memory expansion board for HP Series 200/300 computers.

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NEW PRODUCTS



Onguard power converters offer conversion of both frequency and voltage over the entire range of worldwide standards.

so applications can print to GPIB plotters and printers without any special software modifications.

New GPIB interface kits for Apollo workstations are now available. The GPIB-A/AT Kit is a high-performance GPIB controller kit for the AT bus Apollo Domain 3000 and 4000 Series workstations. The GPIB-A/VME Kit is a high-performance GPIB controller kit for the VMEbus Apollo Domain 500 Series workstations.

The OS/2 product line has been expanded. NI-488 OS/2 multitasking software is now available for controlling GPIB-PCII and GPIB-PCIIA interface boards on PC ATs running under OS/2. Contact National Instruments, 12109 Technology Blvd., Austin, TX 78727-6204; (512) 794-0100.

Circle 386 on reader card

Metro Software Announces LaserTwin 2.0

Metro Software Inc. has announced the availability of LaserTwin version 2.0, the first HP LaserJet Series II emulation program for inkjet and dot-matrix printers.

LaserTwin is ram-resident and acts as an inline filter and transforms these printers into a 100 percent compatible HP LaserJet Series II. LaserTwin's text formatting language allows users to have access to desktop publishing features.

Users with a mix of HP laser, inkjet and dot-matrix printers now can install and use all of their software with a single driver, the

HP LaserJet Series II. LaserTwin requires no additional hardware. Suggested retail price is \$179.

Contact Metro Software Inc., 2509 N. Campbell Ave., Suite 214, Tucson, AZ 85719; (602) 292-0313.

Circle 377 on reader card

Clary Introduces Onguard Power Converters

Clary Corp. has announced the Onguard line of power converters from 800 VA to 3.75 kVA. They offer conversion of both frequency and voltage over the entire range of worldwide standards, unlike conventional converters that are typically dedicated to either voltage or frequency.

The new tap-selectable Onguard power converters accept power standards of 100, 120, 220, 230, 240 or 250 volts and frequencies of either 50 or 60 Hz, and will convert to any combination of voltages and frequencies chosen from the same group. Contact Clary Corp., 320 W. Clary Ave., San Gabriel, CA 91776; (818) 287-6111.

Circle 384 on reader card

CaSaT Technology Enhances LAN Protection Switches

CaSaT Technology Inc. has announced a family of enhanced intelligent LAN protection switches that provides automatic redundancy for IEEE 802.3, 802.4 and proprietary broadband networks.

CaSaT's APS-2220 family consists of standards-conformant products that auto-

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Contact CaSaT Technology Inc, 10 Northern Blvd., Amherst, NH 03031; (603) 880-1833.

Circle 388 on reader card

Neuron Data Strengthens Support Of UNIX Markets

Neuron Data has announced the availability of NEXPERT OBJECT, its expert system shell, for seven UNIX workstations, including the Apollo Series 10000 workstations.

NEXPERT is available for development and delivery on the Apollo 10000 at \$8,000 and \$1,500 respectively.

NEXPERT OBJECT is the standard expert system shell for commercial and industrial integration. NEXPERT features an advanced graphical user interface, a flexible reasoning model and an AI Library of callable routines that allow expert system integration with any other programmer language or operating system.

NEXPERT is also available on the HP 9000 Series 800.

Contact Neuron Data, 444 High St., Palo Alto, CA 94301; (415) 321-4488.

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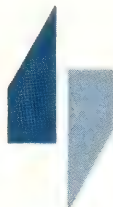
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FOR YOUR INFORMATION

■ Hewlett-Packard has signed a contract with National Car Rental to develop the Smart Key system, the travel industry's first totally automated rental-transaction system. As part of National's progressive "Electronic Advantage" program, preferred travelers can complete their own rental transactions by using National's Smart Key machines. (415) 857-1501.

■ Keithley Instruments (Cleveland, OH) has published a tutorial booklet describing the basic technology of Source-Measure Units, along with an applications handbook that details 24 typical Source-Measure test configurations. (216) 248-0400.

■ M&T Books (Redwood City, CA) is offering *The PC User's Survival Guide* for all PC users wanting specific "how-to" solutions to their computer problems. Included are helpful hints on making the most of computers, handling file-related problems and installing a system. (415) 366-3600.

■ The Stepstone Corp. (Sandy Hook, CT) has announced a new addition to its Object-Oriented Technology Seminar Series. The new course is entitled "Object-Oriented Software Design" and, as a two-day course, emphasizes a pragmatic analysis and design approach based on Stepstone's experience with over 800 customers in the last four years. (203) 426-1875.

Note: For more information about HP products mentioned in *New Products*, contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Customization Express Increases Productivity

Eagle Consulting & Development Corp. announced Release A.03.00 of Customization Express, a product designed to increase the productivity of users of HP Application Dictionary/Monitor-based products.

Release A.03.00 allows users of Materials Management/3000, HP Purchasing and Maintenance/3000 to copy customization from development to production with one command.

Customization Express is priced at \$4,200. Contact Eagle Consulting & Development Corp., 170 Kinnelon Rd., Suite 3, Kinnelon, NJ 07405; (201) 838-5006.

Circle 361 on reader card

Read, Write DOS Discs With HP BASIC

Apogee Software released DOSMAN, a utility for reading and writing DOS discs with an HP BASIC computer.

With DOSMAN the user can work with

any HP disc structure, including HFS, SRM, LIF and SDF; print any DOS or HP file to CRT or printer; create subdirectories on DOS and HP discs; translate DOS files to HP formats (handles Wordstar files, text files and others); catalog any HP or DOS disc and any subdirectories with one key press; purge HP or DOS files and entire DOS subdirectories with a single key press; check a disc; and read DOS 4.0 formats and HP 150 hard discs.

DOSMAN runs on any HP Series 200/300 computer with BASIC 3, 4 and 5 and with any CS80 or SS80 disc or tape drive. DOSMAN is priced at \$495 and includes a detailed manual and phone-in customer support.

Contact Apogee Software, 100 Dogwood Dr., Oakland, NJ 07436; (201) 337-0428.

Circle 358 on reader card

Tymlabs Designs New BackPack Versions

Tymlabs Corp. announced two new versions of BackPack, its high-speed and unattended system backup facility for the HP 3000.

BackPack/XL Version 2.43 combines BackPack/XL's compression technology and parallel processing with the power of HP's RISC architecture. This full native mode version of BackPack/XL for the 900 Series systems is faster than the compatibility mode version of BackPack/XL, which Tymlabs introduced when HP began production shipments of 900 Series systems. Though time savings vary based on file set characteristics and system configuration, on many systems BackPack/XL will run twice as fast as native mode HP STORE.

Version 2.50 of BackPack now offers a compressed disc backup facility. Compressed disc backup requires no operator intervention, utilizing disc as either an intermediate or permanent storage device. The disc devices used can be system discs or private volumes, and both traditional and optical disc media are supported.

Contact Tymlabs Corp., 811 Barton Springs Rd., Austin, TX 78704; (512) 478-0611.

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SpeedEdit is acclaimed as the most capable, yet easiest to use, text editing system available today. In addition to all this, SpeedEdit is available on a wide variety of operating systems and platforms, making SpeedEdit the only editor you need to know.

Versions of SpeedEdit are available for Windows, PM, non-windowed DOS or OS/2, and HP-UX® on the HP-9000 as well as MPE and MPE-XL on the HP-3000. Give us a call for more information on this exciting family of products.



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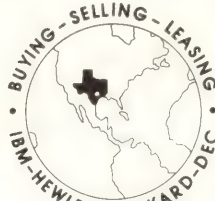
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LaserJet - 500D	\$5000	\$1050
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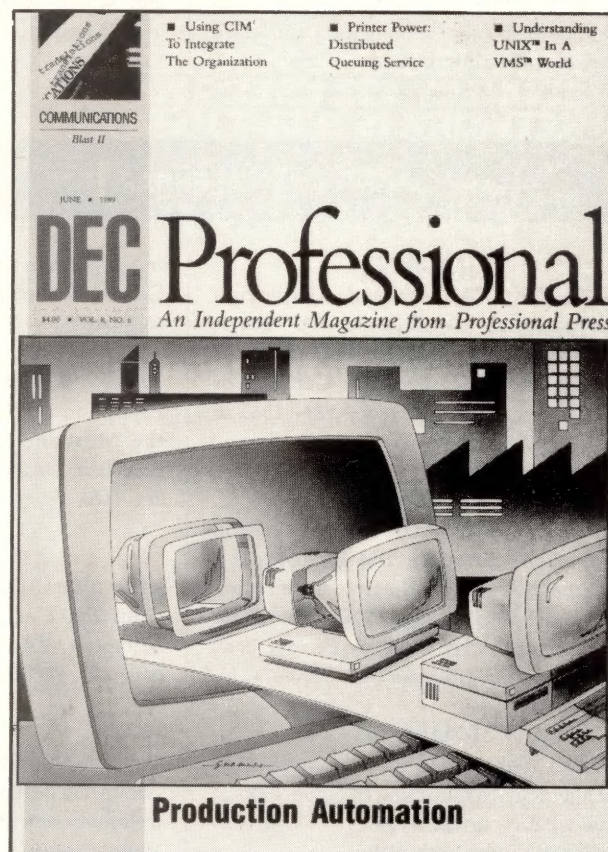
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[CALENDAR]

[JANUARY]

23-25: The 7th Annual UniForum (International Conference Of UNIX Operating Systems Users) is being held at the Washington DC Convention Center. For more information call (800) 323-5155, in Illinois (312) 299-3131.

[FEBRUARY]

5-8: The 13th Annual Communication Networks Conference and Exposition is being held at the Washington Convention Center in Washington, DC. For more information contact Dorothy Ferriter (800) 225-4698 or Robin Poulin (800) 343-6474.

[MARCH]

12-14: The INTEREX Computing Management Symposium is being held at Ceasars Palace in Las Vegas, NV. Call (408) 738-4848 for more information.

19-22: The National Computer Graphics Association (NCGA) is holding a conference

and exposition at the Anaheim Convention Center, Anaheim CA. Call Michael Weiner (703) 698-9600.

27-29: DB/Expo '90, The National Exposition and Conference, is being held at the Moscone Convention Center, San Francisco, CA. Contact Dana De Nardi (415) 941-8440.

[APRIL]

8-10: BWRUG is holding its Fourth Atlantic Conference at Rosslyn Westpark Hotel, Arlington, VA. Registration fee \$175. Call (301) 242- 6777.

[MAY]

2-4: The Southern California Regional Users Group (SCRUG) is holding its 13th annual technical conference and trade show for HP 3000 computer users at the Pasadena Conference Center, Pasadena, CA. For more information contact Betty Vaughan, (213) 450-3383.

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